MATHEMATICS

QUESTION BANK

for

Summative Assessment -II

CLASS – X

2013 – 14

CHAPTER WISE COVERAGE IN THE FORM
MCQ WORKSHEETS AND HOME ASSIGNMENTS

Prepared by

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PREFACE

It gives me great pleasure in presenting the Question Bank for Summative Assessment (SA) - II. It is in accordance with the syllabus of the session 2013–14 for second term (CCE pattern).

Each chapter has a large number of multiple-choice questions in the form of Worksheets, which will help students quickly test their knowledge and skill.

A sufficient number of short answer type and long answer type questions are included in the form of PRACTICE QUESTIONS. This Question Bank is also helpful to all the teachers for internal assessment of the students.

Keeping the mind the mental level of a child, every effort has been made to introduce simple multiple choice questions so that the child solve them easily and gets confidence.

I avail this opportunity to convey my sincere thanks to respected sir Shri Isampal, Deputy Commissioner, KVS RO Bangalore, respected sir Shri P. V. Sairanga Rao, Deputy Commissioner, KVS RO Varanasi, respected sir Shri. K. L. Nagaraju, Assistant Commissioner, KVS RO Bangalore and respected sir Shri.Gangadharaiah, Assistant Commissioner, KVS RO Bangalore for their blessings, motivation and encouragement in bringing out this notes in such an excellent form.

I also extend my special thanks to respected madam Smt. Nirmala Kumari M., Principal, KV Donimalai and respected Shri. M. Vishwanatham, Principal, KV Raichur for their kind suggestions and motivation while preparing this notes.

I would like to place on record my thanks to respected sir Shri. P. K. Chandran, Principal, presently working in KV Bambolim. I have started my career in KVS under his guidance, suggestions and motivation.

Inspite of my best efforts to make this Question Bank error free, some errors might have gone unnoticed. I shall be grateful to the students and teacher if the same are brought to my notice. You may send your valuable suggestions, feedback or queries through email to kumarsir34@gmail.com that would be verified by me and the corrections would be incorporated in the next year Question Bank.

M. S. KUMARSWAMY

DEDICATED

TO

MY FATHER

LATE SHRI. M. S. MALLAYYA

INDEX

SYLLABUS FOR 2nd TERM 2012 – 13
Course Structure
Class X

First Term		Marks : 90
UNITS		**MARKS**
I	ALGEBRA	23
II	GEOMETRY	17
III	TRIGONOMETRY	08
IV	PROBABILITY	08
V	COORDINATE GEOMETRY	11
VI	MENSURATION	23
	TOTAL	**90**

UNIT II : ALGEBRA (Contd.)

3. QUADRATIC EQUATIONS **(15) Periods**

Standard form of a quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$. Solution of the quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship between discriminant and nature of roots. Problems related to day to day activities to be incorporated.

4. ARITHMETIC PROGRESSIONS **(8) Periods**

Motivation for studying AP. Derivation of standard results of finding the n_{th} term and sum of first n terms.

UNIT III : GEOMETRY (Contd.)

2. CIRCLES **(8) Periods**

Tangents to a circle motivated by chords drawn from points coming closer and closer to the point.

1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.
2. (Prove) The lengths of tangents drawn from an external point to circle are equal.

3. CONSTRUCTIONS **(8) Periods**

1. Division of a line segment in a given ratio (internally)
2. Tangent to a circle from a point outside it.
3. Construction of a triangle similar to a given triangle.

UNIT IV : TRIGONOMETRY

3. HEIGHTS AND DISTANCES **(8) Periods**

Simple and believable problems on heights and distances. Problems should not involve more than two right
triangles. Angles of elevation / depression should be only 30^0, 45^0 & 60^0

UNIT V : STATISTICS AND PROBABILITY

2. PROBABILITY **(10) Periods**

Classical definition of probability. Connection with probability as given in Class IX. Simple problems on single events, not using set notation.

UNIT VI : COORDINATE GEOMETRY

1. LINES (In two-dimensions) **(14) Periods**

Review the concepts of coordinate geometry done earlier including graphs of linear equations. Awareness of geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). Area of a triangle.

UNIT VII : MENSURATION

1. AREAS RELATED TO CIRCLES **(12) Periods**

Motivate the area of a circle; area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of 60^o, 90^o & 120^o only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

2. SURFACE AREAS AND VOLUMES **(12) Periods**

(i) Problems on finding surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Frustum of a cone.

(ii) Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken.)

MCQ WORKSHEET-I
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The roots of the equation $x^2 + 7x + 10 = 0$ are
(a) 2 and 5 (b) –2 and 5 (c) –2 and –5 (d) 2 and –5

2. If α, β are the roots of the quadratic equation $x^2 + x + 1 = 0$, then $\frac{1}{\alpha} + \frac{1}{\beta}$
(a) 0 (b) 1 (c) –1 (d) none of these

3. If the equation $x^2 + 4x + k = 0$ has real and distinct roots then
(a) $k < 4$ (b) $k > 4$ (c) $k \leq 4$ (d) $k \geq 4$

4. If the equation $x^2 – ax + 1 = 0$ has two distinct roots then
(a) $|a| = 2$ (b) $|a| < 2$ (c) $|a| > 2$ (d) none of these

5. If the equation $9x^2 + 6kx + 4 = 0$ has equal roots then the roots are both equal to
(a) $\pm\frac{2}{3}$ (b) $\pm\frac{3}{2}$ (c) 0 (d) ± 3

6. If the equation $(a^2 + b^2)x^2 – 2b(a + c)x + b^2 + c^2 = 0$ has equal roots then
(a) $2b = a + c$ (b) $b^2 = ac$ (c) $b = \frac{2ac}{a+c}$ (d) $b = ac$

7. If the equation $x^2 – bx + 1 = 0$ has two distinct roots then
(a) $–3 < b < 3$ (b) $–2 < b < 2$ (c) $b > 2$ (d) $b < –2$

8. If $x = 1$ is a common root of the equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$ then ab =
(a) 6 (b) 3 (c) –3 (d) $\frac{7}{2}$

9. If p and q are the roots of the equation $x^2 – px + q = 0$, then
(a) $p = 1, q = –2$ (b) $p = –2, q = 0$ (c) $b = 0, q = 1$ (d) $p = –2, q = 1$

10. If the equation $ax^2 + bx + c = 0$ has equal roots then c =
(a) $\frac{-b}{2a}$ (b) $\frac{b}{2a}$ (c) $\frac{-b^2}{4a}$ (d) $\frac{b^2}{4a}$

11. If the equation $ax^2 + 2x + a = 0$ has two distinct roots if
(a) $a = \pm 1$ (b) $a = 0$ (c) $a = 0, 1$ (d) $a = –1, 0$

12. The possible value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 – 8x + k = 0$ will both have real roots, is
(a) 4 (b) 8 (c) 12 (d) 16

MCQ WORKSHEET-II
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The value of $\sqrt{6+\sqrt{6+\sqrt{6+....}}}$ is

(a) 4 (b) 3 (c) –2 (d) $\frac{7}{2}$

2. If 2 is the root of the equation $x^2 + bx + 12 = 0$ and the equation $x^2 + bx + q = 0$ has equal roots then q =

(a) 8 (b) 16 (c) –8 (d) –16

3. If the equation $(a^2 + b^2)x^2 – 2(ac + bd)x + c^2 + d^2 = 0$ has equal roots then

(a) ab = cd (b) ad = bc (c) ad = $\sqrt{bc}$ (d) ab = $\sqrt{cd}$

4. If a and b can take values 1, 2, 3, 4. Then the number of the equations of the form $ax^2 + bx + c = 0$ having real roots is

(a) 6 (b) 7 (c) 10 (d) 12

5. The number of quadratic equations having real roots and which do not change by squaring their roots is

(a) 4 (b) 3 (c) 2 (d) 1

6. If one of the roots of the quadratic equation $(k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other then k =

(a) 2 (b) 1 (c) –1 (d) – 2

7. If α, β are the roots of the quadratic equation $4x^2 + 3x + 7 = 0$, then $\frac{1}{\alpha}+\frac{1}{\beta}$

(a) $\frac{7}{3}$ (b) $\frac{-7}{3}$ (c) $\frac{3}{7}$ (d) $\frac{-3}{7}$

8. If α, β are the roots of the quadratic equation $x^2 – p(x + 1) – c = 0$, then $(\alpha+1)(\beta+1)$ =

(a) c – 1 (b) 1 – c (c) c (d) 1 + c

9. Find the values of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has real equal roots.

(a) $\pm 2\sqrt{6}$ (b) $2\sqrt{6}$ (c) 0 (d) ± 2

10. Find the values of k for which the quadratic equation $kx(x – 3) + 9 = 0$ has real equal roots.

(a) k = 0 or k = 4 (b) k = 1 or k = 4 (c) k = –3 or k = 3 (d) k = –4 or k = 4

11. Find the values of k for which the quadratic equation $4x^2 – 3kx + 1 = 0$ has real and equal roots.

(a) $\pm\frac{4}{3}$ (b) $\pm\frac{2}{3}$ (c) ± 2 (d) none of these

12. Find the values of k for which the quadratic equation $(k – 12)x^2 + 2(k – 12)x + 2 = 0$ has real and equal roots.

(a) k = 0 or k = 14 (b) k = 12 or k = 24 (c) k = 14 or k = 12 (d) k = 1 or k = 12

MCQ WORKSHEET-III
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The value of k for which equation 9x2 + 8xk + 8 = 0 has equal roots is:
(a) only 3 (b) only –3 (c) ±3 (d) 9

2. Which of the following is not a quadratic equation?
(a) $x-\frac{3}{x}=4$ (b) $3x-\frac{5}{x}=x^2$ (c) $x+\frac{1}{x}=3$ (d) $x^2-3=4x^2-4x$

3. Which of the following is a solution of the quadratic equation $2x^2 + x – 6 = 0$?
(a) x = 2 (b) x = –12 (c) x = $\frac{3}{2}$ (d) x = –3

4. The value of k for which x = –2 is a root of the quadratic equation $kx^2 + x – 6 = 0$
(a) –1 (b) –2 (c) 2 (d) $-\frac{3}{2}$

5. The value of p so that the quadratics equation $x^2 + 5px + 16 = 0$ has no real root, is
(a) p>8 (b) p<5 (c) $\frac{-8}{5}<x<\frac{8}{5}$ (d) $\frac{-8}{5}\le x<0$

6. If $px^2 + 3w + q = 0$ has two roots x = –1 and x = –2, the value of q – p is
(a) –1 (b) –2 (c) 1 (d) 2

7. The common root of the quadratic equation $x^2 – 3x + 2 = 0$ and $2x^2 – 5x + 2 = 0$ is:
(a) x = 2 (b) x = –2 (c) x = $\frac{1}{2}$ (d) x = 1

8. If $x^2 – 5x + 1 = 0$, the value of $\left(x+\frac{1}{x}\right)$ is:
(a) –5 (b) –2 (c) 5 (d) 3

9. If a – 3 = $\frac{10}{a}$, the value of a are
(a) –5, 2 (b) 5, –2 (c) 5, 2 (d) 5, 0

10. If the roots of the quadratic equation $kx^2 + (a + b)x + ab = 0$ are (–1, –b), the value of k is:
(a) –1 (b) –2 (c) 1 (d) 2

11. The quadratic equation with real coefficient whose one root is $2+\sqrt{3}$ is:
(a) $x^2 – 2x + 1 = 0$ (b) $x^2 – 4x + 1 = 0$ (c) $x^2 – 4x + 3 = 0$ (d) $x^2 – 4x + 4 = 0$

12. If the difference of roots of the quadratic equation $x^2 + kx + 12 = 0$ is 1, the positive value of k is:
(a) –7 (b) 7 (c) 4 (d) 8

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. Find the values of k for which the quadratic equation $k^2x^2 - 2(k - 1)x + 4 = 0$ has real and equal roots.

(a) k = 0 or k = $\frac{1}{3}$ (b) k = 1 or k = $\frac{1}{3}$ (c) k = –1 or k = $\frac{1}{3}$ (d) k = –3 or k = $\frac{1}{3}$

2. If –4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, find the value of p and q.

(a) p =3, q = 9 (b) p =9, q = 3 (c) p = 3, q = $\frac{4}{9}$ (d) p = 3, q = $\frac{9}{4}$

3. If the roots of the equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, then b + c =

(a) 2a (b) 2bc (c) 2c (d) none of these

4. Find the positive value of k for which the equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots.

(a) 8 (b) 16 (c) –8 (d) –16

5. Find the positive value of k for which the equation $kx^2 - 6x - 2 = 0$ has real roots

(a) $k \le \frac{-9}{2}$ (b) $k \ge \frac{-9}{2}$ (c) k > $\frac{-9}{2}$ (d) k< $\frac{-9}{2}$

6. Find the positive value of k for which the equation $3x^2 + 2x + k = 0$ has real roots

(a) $k \ge \frac{1}{3}$ (b) $k \le \frac{1}{3}$ (c) k > $\frac{1}{3}$ (d) k< $\frac{1}{3}$

7. Find the positive value of k for which the equation $2x^2 + kx + 2 = 0$ has real roots

(a) $k \ge 4$ (b) $k \le -4$ (c) both (a) and (c) (d) none of these.

8. The sum of a number and its reciprocal is $\frac{10}{3}$. Find the number.

(a) 3 (b) $\frac{1}{3}$ (c) both (a) and (c) (d) none of these

9. Divide 12 into two parts such that the sum of their squares is 74.

(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

10. The sum of the squares of two consecutive natural numbers is 421. Find the numbers.

(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these

11. The sum of two numbers is 15 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.

(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these

12. Divide 12 into two parts such that their product is 32.

(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
FACTORISATION METHOD

Solve the following quadratic equations:

1. $x^2 + 11x + 30 = 0$

2. $x^2 + 18x + 32 = 0$

3. $x^2 + 7x - 18 = 0$

4. $x^2 + 5x - 6 = 0$

5. $y^2 - 4y + 3 = 0$

6. $x^2 - 21x + 108 = 0$

7. $x^2 - 11x - 80 = 0$

8. $x^2 - x - 156 = 0$

9. $z^2 - 32z - 105 = 0$

10. $40 + 3x - x^2 = 0$

11. $6 - x - x^2 = 0$

12. $7x^2 + 49x + 84 = 0$

13. $m^2 + 17mn - 84n^2 = 0$

14. $5x^2 + 16x + 3 = 0$

15. $6x^2 + 17x + 12 = 0$

16. $9x^2 + 18x + 8 = 0$

17. $14x^2 + 9x + 1 = 0$

18. $2x^2 + 3x - 90 = 0$

19. $2x^2 + 11x - 21 = 0$

20. $3x^2 - 14x + 8 = 0$

21. $18x^2 + 3x - 10 = 0$

22. $15x^2 + 2x - 8 = 0$

23. $6x^2 + 11x - 10 = 0$

24. $30x^2 + 7x - 15 = 0$

25. $24x^2 - 41x + 12 = 0$

26. $2x^2 - 7x - 15 = 0$

27. $6x^2 + 11x - 10 = 0$

28. $10x^2 - 9x - 7 = 0$

29. $5x^2 - 16x - 21 = 0$

30. $2x^2 - x - 21 = 0$

31. $15x^2 - x - 28 = 0$

32. $8a^2 - 27ab + 9b^2 = 0$

33. $5x^2 + 33xy - 14y^2 = 0$

34. $3x^3 - x^2 - 10x = 0$

35. $x^2 + 9x + 18 = 0$

36. $x^2 + 5x - 24 = 0$

37. $x^2 - 4x - 21 = 0$

38. $6x^2 + 7x - 3 = 0$

39. $2x^2 - 7x - 39 = 0$

40. $9x^2 - 22x + 8 = 0$

41. $6x^2 + 40 = 31x$

42. $36x^2 - 12ax + (a^2 - b^2) = 0$

43. $8x^2 - 22x - 21 = 0$

44. $2x^2 - x + \frac{1}{8} = 0$

45. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
FACTORISATION METHOD

Solve the following by Factorisation method:

1. $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

2. $2x - \frac{3}{x} = 1$

3. $\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0, \frac{-3}{2}$

4. $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15},\ x \neq -1$ and $x \neq 0$

5. $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$

6. $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}(x \neq 2, 4)$

7. $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, [x \neq 0, -(a+b)]$

8. $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, x \neq -3, \frac{1}{2}$

9. $5^{(x+1)} + 5^{(2-x)} = 5^3 + 1$

10. $5x - \frac{35}{x} = 18, x \neq 0$

11. $2^{2x} - 3.2^{(x+2)} + 32 = 0$

12. $4^{(x+1)} + 4^{(1-x)} = 10$

13. $3^{(x+2)} + 3^{-x} = 10$

14. $10x - \frac{1}{x} = 3$

15. $\frac{2}{x^2} - \frac{5}{x} + 2 = 0$

16. $\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

17. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

18. $3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$

19. $\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$

20. $4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$

21. $x^2-(1+\sqrt{2})x+\sqrt{2}=0$

22. $\left(\frac{4x-3}{2x+1}\right)-10\left(\frac{2x+1}{4x-3}\right)=3,\left(x\neq\frac{-1}{2},\frac{3}{4}\right)$

23. $\left(\frac{x}{x+1}\right)^2-5\left(\frac{x}{x+1}\right)+6=0,(x\neq-1)$

24. $2\left(\frac{2x-1}{x+3}\right)-3\left(\frac{x+3}{2x-1}\right)=5,\left(x\neq-3,\frac{1}{2}\right)$

25. $2\left(\frac{x-1}{x+3}\right)-7\left(\frac{x+3}{x-1}\right)=5,(x\neq-3,1)$

26. $\frac{a}{x-b}+\frac{b}{x-a}=2,(x\neq a,b)$

27. $\frac{a}{ax-1}+\frac{b}{bx-1}=a+b,\left(x\neq\frac{1}{a},\frac{1}{b}\right)$

28. $\frac{x+3}{x-2}-\frac{1-x}{x}=\frac{17}{4},(x\neq0,2)$

29. $\frac{2x}{x-4}+\frac{2x-5}{x-3}=\frac{25}{3},(x\neq4,3)$

30. $\frac{1}{x-3}-\frac{1}{x+5}=\frac{1}{6},(x\neq3,-5)$

31. $\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x},(x\neq2,1)$

32. $\frac{1}{x+4}-\frac{1}{x-7}=\frac{11}{30},(x\neq-4,7)$

33. $\frac{1}{x-2}+\frac{1}{x-4}=\frac{4}{3},(x\neq2,4)$

34. $\frac{x-3}{x+3}-\frac{x+3}{x-3}=6\frac{6}{7},(x\neq-3,3)$

35. $\frac{2x}{x-3}+\frac{1}{2x+3}+\frac{3x+9}{(x-3)(2x+3)}=0$

36. $x=\dfrac{1}{2-\dfrac{1}{2-\dfrac{1}{2-x}}},x\neq2$

37. $4x^2-2(a^2+b^2)x+a^2b^2=0$

38. $9x^2-9(a+b)x+(2a^2+5ab+2b^2)=0$

39. $4x^2-4a^2x+(a^4-b^4)=0$

40. $x^2+\left(\frac{a+b}{a}+\frac{a}{a+b}\right)x+1=0$

41. $x^2+x-(a+1)(a+2)=0$

42. $x^2+3x-(a^2+a-2)=0$

43. $a^2b^2x^2+b^2x-a^2x-1=0$

44. $x+\frac{1}{x}=25\frac{1}{25}$

45. $(x-3)(x-4)=\frac{34}{(33)^2}$

46. $x^2+\left(a+\frac{1}{a}\right)x+1=0$

47. $(a+b)^2x^2-4abx-(a-b)^2=0$

48. $7x+\frac{3}{x}=35\frac{3}{5}$

49. $\frac{x-a}{x-b}+\frac{x-b}{x-a}=\frac{a}{b}+\frac{b}{a}$

50. $(x-5)(x-6)=\frac{25}{(24)^2}$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
METHOD OF COMPLETING THE SQUARE

Solve the following quadratic equation (if they exist) by the method of completing the square:

1. $8x^2 - 22x - 21 = 0$

2. $2x^2 - x + \frac{1}{8} = 0$

3. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

4. $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

5. $9x^2 - 15x + 6 = 0$

6. $2x^2 - 5x + 3 = 0$

7. $4x^2 + 3x + 5 = 0$

8. $5x^2 - 6x - 2 = 0$

9. $4x^2 + 4bx - (a^2 - b^2) = 0$

10. $a^2x^2 - 3abx + 2b^2 = 0$

11. $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$

12. $x^2 - 4ax + 4a^2 - b^2 = 0$

13. $x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$

14. $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

15. $\sqrt{2}x^2 - 3x - 2\sqrt{2} = 0$

16. $4x^2 + 4\sqrt{3}x + 3 = 0$

17. $2x^2 + x + 4 = 0$

18. $2x^2 + x - 4 = 0$

19. $3x^2 + 11x + 10 = 0$

20. $2x^2 - 7x + 3 = 0$

21. $5x^2 - 19x + 17 = 0$

22. $2x^2 + x - 6 = 0$

23. $2x^2 - 9x + 7 = 0$

24. $6x^2 + 7x - 10 = 0$

25. $x^2 - 4\sqrt{2}x + 6 = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
METHOD OF QUADRATIC FORMULA

Show that each of the following equations has real roots, and solve each by using the quadratic formula:

1. $9x^2 + 7x - 2 = 0$

2. $x^2 + 6x + 6 = 0$

3. $2x^2 + 5\sqrt{3}x + 6 = 0$

4. $36x^2 - 12ax + (a^2 - b^2) = 0$

5. $a^2b^2x^2 - (4b^4 - 3a^4)x - 12a^2b^2 = 0$

6. $(a+b)^2x^2 - 4abx - (a-b)^2 = 0$

7. $4x^2 - 2(a^2 + b^2)x + a^2b^2 = 0$

8. $9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$

9. $4x^2 - 4a^2x + (a^4 - b^4) = 0$

10. $\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

11. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

12. $3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$

13. $\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$

14. $4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$

15. $x^2 - (1+\sqrt{2})x + \sqrt{2} = 0$

16. $2x^2 + 5\sqrt{3}x + 6 = 0$

17. $x^2 - 2x + 1 = 0$

18. $3x^2 + 2\sqrt{5}x - 5 = 0$

19. $3a^2x^2 + 8abx + 4b^2 = 0, a \neq 0$

20. $2x^2 - 2\sqrt{6}x + 3 = 0$

21. $3x^2 - 2x + 2 = 0$

22. $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$

23. $x^2 + x + 2 = 0$

24. $16x^2 = 24x + 1$

25. $25x^2 + 20x + 7 = 0$

26. $6x^2 + x - 2 = 0$

27. $x^2 + 5x + 5 = 0$

28. $p^2x^2 + (p^2 - q^2)x - q^2 = 0$

29. $abx^2 + (b^2 - ac)x - bc = 0$

30. $x^2 - 2ax + (a^2 - b^2) = 0$

31. $12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

32. $24x^2 - 41x + 12 = 0$

33. $2x^2 - 7x - 15 = 0$

34. $6x^2 + 11x - 10 = 0$

35. $10x^2 - 9x - 7 = 0$

36. $x^2 - x - 156 = 0$

37. $z^2 - 32z - 105 = 0$

38. $40 + 3x - x^2 = 0$

39. $6 - x - x^2 = 0$

40. $7x^2 + 49x + 84 = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
NATURE OF ROOTS

1. Find the value of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has two real equal roots.

2. Find the value of k for which the quadratic equation $kx(x – 3) + 9 = 0$ has two real equal roots.

3. Find the value of k for which the quadratic equation $4x^2 – 3kx + 1 = 0$ has two real equal roots..

4. If –4 is a root of the equation $x^2 + px – 4 = 0$ and the equation $x^2 + px + q = 0$ has equal roots, find the value of p and q.

5. If –5 is a root of the equation $2x^2 + px – 15 = 0$ and the equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k.

6. Find the value of k for which the quadratic equation $(k – 12)x^2 + 2(k – 12)x + 2 = 0$ has two real equal roots..

7. Find the value of k for which the quadratic equation $k^2x^2 – 2(k – 1)x + 4 = 0$ has two real equal roots..

8. If the roots of the equation $(a – b)x^2 + (b – c)x + (c – a) = 0$ are equal, prove that $b + c = 2a$.

9. Prove that both the roots of the equation $(x – a)(x – b) + (x – b)(x – c) + (x – c)(x – a) = 0$ are real but they are equal only when $a = b = c$.

10. Find the positive value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 – 8x + k = 0$ will have real roots.

11. Find the value of k for which the quadratic equation $kx^2 – 6x – 2 = 0$ has two real roots.

12. Find the value of k for which the quadratic equation $3x^2 + 2x + k = 0$ has two real roots.

13. Find the value of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has two real roots.

14. Show that the equation $3x^2 + 7x + 8 = 0$ is not true for any real value of x.

15. Show that the equation $2(a^2 + b^2)x^2 + 2(a + b)x + 1 = 0$ has no real roots, when $a \neq b$.

16. Find the value of k for which the quadratic equation $kx^2 + 2x + 1 = 0$ has two real and distinct roots.

17. Find the value of p for which the quadratic equation $2x^2 + px + 8 = 0$ has two real and distinct roots.

18. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 – a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.

19. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + (b^2 - ac) = 0$ are real and equal, show that either $a = 0$ or $(a^3 + b^3 + c^3) = 3abc$.

20. Find the value of k for which the quadratic equation $9x^2 + 8kx + 16 = 0$ has two real equal roots.

21. Find the value of k for which the quadratic equation $(k + 4)x^2 + (k+1)x + 1 = 0$ has two real equal roots.

22. Prove that the equation $x^2(a^2 + b^2) + 2x(ac + bd) + (c^2 + d^2) = 0$ has no real root, if $ad \neq bc$.

23. If the roots of the equation $x^2 + 2cx + ab = 0$ are real unequal, prove that the equation $x^2 - 2(a + b) + a^2 + b^2 + 2c^2 = 0$ has no real roots.

24. Find the positive values of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.

25. Find the value of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ has equal roots.

26. Find the value of k for which the quadratic equation $x^2 - 2(k + 1)x + k^2 = 0$ has real and equal roots.

27. Find the value of k for which the quadratic equation $k^2x^2 - 2(2k - 1)x + 4 = 0$ has real and equal roots.

28. Find the value of k for which the quadratic equation $(k + 1)x^2 - 2(k - 1)x + 1 = 0$ has real and equal roots.

29. Find the value of k for which the quadratic equation $(4 - k)x^2 + (2k + 4)x + (8k + 1) = 0$ has real and equal roots.

30. Find the value of k for which the quadratic equation $(2k + 1)x^2 + 2(k + 3)x + (k + 5) = 0$ has real and equal roots.

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
WORD PROBLEMS CATEGORY WISE

I. NUMBER BASED QUESTIONS

DIRECT QUESTIONS

1. The difference of two numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$. Find the numbers.
2. Find two consecutive odd positive integers, sum of whose squares is 290.
3. The difference of the squares of two numbers is 45. The squares of the smaller number are 4 times the larger number. Find the numbers.
4. The sum of the squares of the two positive integers is 208. If the square of the larger number is 18 times the smaller number, find the numbers.
5. The denominator of a fraction is 3 more than its numerator. The sum of the fraction and its reciprocal is $2\frac{9}{10}$. Find the fraction.
6. The denominator of a fraction is one more than twice the numerator. The sum of the fraction and its reciprocal is $2\frac{16}{21}$. Find the fraction.
7. Two numbers differ by 3 and their product is 504. Find the numbers.
8. Find three consecutive positive integers such that the sum of the square of the first and the product of the other two is 154.
9. The sum of two numbers is 16 and the sum of their reciprocals is $\frac{1}{3}$. Find the numbers.
10. The sum of two numbers is 18 and the sum of their reciprocals is $\frac{1}{4}$. Find the numbers.
11. The sum of two numbers is 25 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.
12. The sum of two numbers is 15 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.
13. The sum of a number and its reciprocal is $3\frac{41}{80}$. Find the numbers.
14. The sum of the squares of three consecutive positive integers is 50. Find the integers.
15. Find two natural numbers, the sum of whose squares is 25 times their sum and also equal to 50 times their difference.

TWO-DIGIT PROBLEMS

1. A two digit number is such that the product of its digits is 12. When 36 is added to the number, the digits are reversed. Find the number.
2. A two digit number is such that the product of its digits is 8. When 54 is subtracted from the number, the digits are reversed. Find the number.
3. A two digit number is four times the sum and twice the product of its digits. Find the number
4. A two digit number is such that the product of its digits is 14. When 45 is added to the number, the digits interchange their places. Find the number.

5. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.
6. A two digit number is four times the sum and three times the product of its digits. Find the number
7. A two digit number is such that the product of its digits is 8. When 18 is subtracted from the number, the digits are reversed. Find the number.
8. A two digit number is 4 times the sum of its digits and twice the product of its digits. Find the number.
9. A two digit number is 5 times the sum of its digits and is also equal to 5 more than twice the product of its digits. Find the number.
10. A two digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number.

II. AGE RELATED QUESTIONS

1. The sum of ages of a father and his son is 45 years. Five years ago, the product of their ages in years was 124. Find their present ages.
2. Seven years ago Varun's age was five times the square of Swati's age. Three years hence Swati's age will be two fifth of Varun's age. Find their present ages.
3. The product of Rohit's age five years ago with his age 9 years later is 15 in years. Find his present age.
4. The product of Archana's age five years ago with her age 8 years later is 30 in years. Find her present age.
5. The sum of the ages of a man and his son is 45 years. Five years ago, the product of their ages in years was four times the man's age at that time. Find their present ages.
6. The sum of the ages of a boy and his brother is 25 years and the product of their ages in years is 126. Find their ages.
7. The sum of the ages of a boy and his brother is 12 years and the sum of the square of their ages is 74 in years. Find their ages.
8. A boy is one year older than his friend. If the sum of the square of their ages is 421, find their ages.
9. The difference of the ages of a boy and his brother is 3 and the product of their ages in years is 504. Find their ages.
10. The sum of the ages of a boy and his brother is 57 years and the product of their ages in years is 782. Find their ages.

III. SPEED, DISTANCE AND TIME RELATED QUESTIONS

1. A motor boat whose speed is 18 km/hr in still water takes 1 hour more to go 24 upstream than to return to the same point. Find the speed of the stream.
2. A motorboat whose speed is 9km/hr in still water, goes 15 km downstream and comes back in a total time of 3 hours 45 minutes. Find the speed of the stream.
3. A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find its usual speed.
4. In a flight for 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the original duration of flight.
5. A plane left 30 minutes later than the schedule time and in order to reach its destination 1500 km away in time it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.
6. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the

average speed of the express train is 11km/h more than that of the passenger train, find the average speed of the two trains.

7. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

8. In a flight for 6000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 400 km/hr and consequently time of flight increased by 30 minutes. Find the original duration of flight.

9. The time taken by a man to cover 300 km on a scooter was $1\frac{1}{2}$ hours more than the time taken by him during the return journey. If the speed in returning be 10 km/hr more than the speed in going, find its speed in each direction.

10. A motorboat whose speed is 15 km/hr in still water, goes 30 km downstream and comes back in a total time of 4 hours 30 minutes. Find the speed of the stream.

11. The speed of a boat in still water is 8 km/hr. It can go 15 km upstream and 22 km downstream in 5 hours. Find the speed of the stream.

12. A motor boat goes 10 km upstream and returns back to the starting point in 55 minutes. If the speed of the motor boat in still water is 22 km/hr, find the speed of the current.

13. A sailor can row a boat 8 km downstream and return back to the starting point in 1 hour 40 minutes. If the speed of the stream is 2 km/hr, find the speed of the boat in still water.

14. A train covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hr more, it would have taken 30 minutes les for the journey. Find the original speed of the train.

15. The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/hr.

16. An aeroplane left 30 minutes later than it schedule time and in order to reach its destination 1500 km away in time, it had to increase its speed by 250 km/hr from its usual speed. Determine its usual speed.

IV. GEOMETRICAL FIGURES RELATED QUESTIONS

1. The sum of the areas of two squares is 640 m^2. If the difference in their perimeters be 64 m, find the sides of the two squares.

2. The hypotenuse of a right triangle is $3\sqrt{10}$ cm. If the smaller side is tripled and the longer sides doubled, new hypotenuse will be $9\sqrt{5}$ cm. How long are the sides of the triangle?

3. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

4. The sum of the areas of two squares is 468 m^2. If the difference of their perimeters is 24 m, find the sides of the two squares.

5. The hypotenuse of a right triangle is $3\sqrt{5}$ cm. If the smaller side is tripled and the longer sides doubled, new hypotenuse will be 15 cm. How long are the sides of the triangle?

6. The hypotenuse of right-angled triangle is 6 m more than twice the shortest side. If the third side is 2 m less than the hypotenuse, find the sides of the triangle.

7. The hypotenuse of a right triangle is 25 cm. The difference between the lengths of the other two sides of the triangle is 5 cm. Find the lengths of these sides.

8. The diagonal of a rectangular field is 60 m more than the shortest side. If the longer side is 30 m more than the shorter side, find the sides of the field.

9. The perimeter of a right triangle is 60 cm. Its hypotenuse is 25 cm. Find the area of the triangle.

10. The side of a square exceeds the side of the another square by 4 cm and the sum of the areas of the two squares is 400 cm^2. Find the dimensions of the squares.

11. The length of the rectangle exceeds its breadth by 8 cm and the area of the rectangle is 240 cm^2. Find the dimensions of the rectangle.

12. A chess board contains 64 squares and the area of each square is 6.25 cm^2. A border round the board is 2 cm wide. Find the length of the side of the chess board.

13. A rectangular field is 25 m long and 16 m broad. There is a path of equal width all around inside it. If the area of the path is 148 m^2, find the width of the path.

14. The length of a rectangle is thrice as long as the side of a square. The side of the square is 4 cm more than the breadth of the rectangle. Their areas being equal, find their dimensions.

15. A farmer prepares a rectangular vegetable garden of area 180 m^2. With 39 m of barbed wire, he can fence the three sides of the garden, leaving one of the longer sides unfenced. Find the dimensions of the garden.

16. A rectangular field is 16 m long and 10 m broad. There is a path of equal width all around inside it. If the area of the path is 120 m^2, find the width of the path.

17. The area of right triangle is 600 cm^2. If the base of the triangle exceeds the altitude by 10 cm, find the dimensions of the triangle.

18. The area of right triangle is 96 m^2. If the base of the triangle three times the altitude, find the dimensions of the triangle.

19. The length of the hypotenuse of a right triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1 cm. Find the length of each side of the triangle.

20. The hypotenuse of a right triangle is 1 m less than twice the shortest side. If the third side is 1 m more than the shortest side, find the sides of the triangle.

V. TIME AND WORK RELATED QUESTIONS

1. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

2. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work.

3. Two pipes running together can fill a cistern in $3\frac{1}{13}$ hours. If one pipe takes 3 minutes more than the other to fill the cistern. Find the time in which each pipe can separately fill the cistern.

4. A takes 10 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 12 days, find the time taken by B to finish the work.

5. If two pipes function simultaneously, a reservoir will be filled in 12 hours. One pipe fills the reservoir 10 hours faster than the other. How many hours will the second pipe take to fill the reservoir?

VI. REASONING BASED QUESTIONS

1. In a class test, the sum of Ranjitha's marks in mathematics and English is 40. Had she got 3 marks more in mathematics and 4 marks less in English, the product of the marks would have been 360. Find her marks in two subjects separately.

2. Out of a number of saras birds, one-fourth of the number are moving about in lots, $\frac{1}{9}$th coupled with $\frac{1}{4}$th as well as 7 times the square root of the number move on a hill, 56 birds remain in vakula trees. What is the total number of trees?

3. A teacher attempting to arrange the students for mass drill in the form of a solid square found that 24 students were left. When he increased the size of the square by 1 student, he found that he was short of 25 students. Find the number of students.

4. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m (see Fig. 4.3). Find its length and breadth.

5. John and Jivanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marble they now have is 124. We would like to find out how many marbles they had to start with.

6. In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

7. 300 apples are distributed equally among a certain number of students. Had there been 10 more students, each would have received one apple less. Find the number of students.

8. A man buys a number of pens for Rs. 80. If he has bought 4 more pens for the same amount, each pen would have cost him Re. 1 less. How many pens did he buy?

9. One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels.

10. Out of a group of swans, $\frac{7}{2}$ times the square root of the number are playing on the shore of a tank. The two remaining ones are playing with amorous fight in the water. What is the total number of swans?

11. In a class test, the sum of the marks obtained by P in mathematics and science is 28. Had he got 3 more marks in mathematics and 4 marks less in science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained by him in the two subjects separately.

12. Rs 250 was divided equally among a certain number of children. If there were 25 more children, each would have received 50 paise less. Find the number of children.

13. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounches on it. If their speeds are equal at what distance from the whole is the snake caught?

14. A shopkeeper buys a number of books for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Rs. 1 less. How many books did he buy?

15. If the list price of a toy is reduced by Rs. 2, a person can buy 2 toys more for Rs. 360. Find the original price of the toy.

MCQ WORKSHEET-I
CLASS X: CHAPTER – 5
ARITHMETIC PROGRESSION

1. If p – 1, p + 3, 3p – 1 are in AP, then p is equal to
(a) 4 (b) – 4 (c) 2 (d) – 2

2. The sum of all terms of the arithmetic progression having ten terms except for the first term is 99 and except for the sixth term 89. Find the third term of the progression if the sum of the first term and the fifth term is equal to 10
(a) 15 (b) 5 (c) 8 (d) 10

3. If in any decreasing arithmetic progression, sum of all its terms, except the first term is equal to - 36, the sum of all its terms, except for the last term is zero and the difference of the tenth and the sixth term is equal to - 1 6 , then first term of the series is
(a) 15 (b) 14 (c) 16 (d) 17

4. If the third term of an AP is 12 and the seventh term is 24, then the 10th term is
(a) 33 (b) 34 (c) 35 (d) 36

5. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this AP ?
(a) 4551 (b) 10091 (c) 7881 (d) 13531

6. A number 15 is divided into three parts which are in AP and sum of their squares is 83. The smallest part is
(a) 2 (b) 5 (c) 3 (d) 6

7. How many terms of an AP must be taken for their sum to be equal to 120 if its third term is 9 and the difference between the seventh and second term is 20 ?
(a) 7 (b) 8 (c) 9 (d) 6

8. 9th term of an AP is 499 and 499th term is 9. The term which is equal to zero is
(a) 507th (b) 508th (c) 509th (d) 510th

9. The sum of all two digit numbers which when divided by 4 yield unity as remainder is
(a) 1012 (b) 1201 (c) 1212 (d) 1210

10. An AP consist of 31 terms if its 16th term is m, then sum of all the terms of this AP is
(a) 16 m (b) 47 m (c) 31 m (d) 52 m

11. If a clock strikes once at one O'clock, twice at two O'clock, thrice at 3 O'clock and so on and again once at one O'clock and so on, then how many times will the bell be struck in the course of 2 days ?
(a) 156 (b) 312 (c) 78 (d) 288

12. In a certain AP, 5 times the 5th term is equal to 8 times the 8th term, then its 13th term is equal to
(a) 5 (b) 1 (c) 0 (d) 13

MCQ WORKSHEET-II
CLASS X: CHAPTER – 5
ARITHMETIC PROGRESSION

1. The sum of 5 numbers in AP is 30 and sum of their squares is 220. Which of the following is the third term ?
(a) 5 (b) 6 (c) 7 (d) 8

2. If a, b, c, d, e and f are in AP, then e – c is equal to
(a) 2(c – a) (b) 2(f – d) (c) 2(d – c) (d) d – c

3. The sum of n terms of the series 2, 5, 8,11,.... is 60100, then n is
(a) 100 (b) 150 (c) 200 (d) 250

4. The value of the expression 1 - 6 + 2 - 7 + 3 - 8 + ... to 100 terms
(a) –225 (b) –250 (c) –300 (d) –350

5. Four numbers are inserted between the numbers 4 and 39 such that an AP results. Find the biggest of these four numbers
(a) 30 (b) 31 (c) 32 (d) 33

6. The sum of the first ten terms of an AP is four times the sum of the first five terms, then the ratio of the first term to the common difference is
(a) 1/2 (b) 2 (c) 1/4 (d) 4

7. Two persons Anil and Happy joined D. W. Associates. Aniland Happy started with an initial salary of Rs. 50000 and Rs. 64000 respectively with annual increment of Rs.2500 and Rs. 2000 each respectively. In which year will Anil start earning more salary than Happy ?
(a) 28th (b) 29th (c) 30th (d) 27th

8. A man receives Rs. 60 for the first week and Rs. 3 more each week than the preceeding week. How much does he earns by the 20th week ?
(a) Rs. 1760 (b) Rs. 1770 (c) Rs. 1780 (d) Rs. 1790

9. Find 10th term whose 5th term is 24 and difference between 7th term and 10th term is 15
(a) 34 (b) 39 (c) 44 (d) 49

10. Find the sum of first n terms of odd natural number.
(a) n^2 (b) $n^2 - 1$ (c) $n^2 + 1$ (d) $2n - 1$

11. Common difference of an A.P. is -2 and first term is 80. Find the sum if last term is 10.
(a) 1600 (b) 1620 (c) 1650 (d) 1700

12. Find the sum of first 30 terms of an A. P. whose n^{th} term is $2 + 1/2n$
(a) 292.5 (b) 290.5 (c) 192.5 (d) none of these

13. Find 15^{th} term of -10, -5, 0, 5, ------
(a) 55 (b) 60 (c) 65 (d) none of these

14. If the numbers a, b, c, d, e form an AP, then the value of a - 4b + 6c - 4d + e is
(a) 1 (b) 2 (c) 0 (d) none of these

MCQ WORKSHEET-III
CLASS X: CHAPTER – 5
ARITHMETIC PROGRESSION

1. 7th term of an AP is 40. The sum of its first 13th terms is
(a) 500 (b) 510 (c) 520 (d) 530

2. The sum of the first four terms of an AP is 28 and sum of the first eight terms of the same AP is 88. Sum of first 16 terms of the AP is

(a) 346 (b) 340 (c) 304 (d) 268

3. Which term of the AP 4, 9, 14, 19, ….. is 109?
(a) 14th (b) 18th (c) 22nd (d) 16th

4. How many terms are there in the arithmetic series 1 + 3 + 5 + …….. + 73 + 75?
(a) 28 (b) 30 (c) 36 (d) 38

5. 51 + 52 + 53 + 54 +……. + 100 = ?
(a) 3775 (b) 4025 (c) 4275 (d) 5050

6. How many natural numbers between 1 and 1000 are divisible by 5?
(a) 197 (b) 198 (c) 199 (d) 200

7. If a, a – 2 and 3a are in AP, then the value of a is
(a) –3 (b) –2 (c) 3 (d) 2

8. How many terms are there in the AP 7, 10, 13, …. , 151?
(a) 50 (b) 55 (c) 45 (d) 49

9. The 4th term of an AP is 14 and its 12th term is 70. What is its first term?
(a) –10 (b) –7 (c) 7 (d) 10

10. The first term of an AP is 6 and the common difference is 5. What will be its 11th term?
(a) 56 (b) 41 (c) 46 (d) none of these

11. Which term of the AP 72, 63, 54, ……. is 0?
(a) 8th (b) 9th (c) 11th (d) 12th

12. The 8th term of an AP is 17 and its 14th term is –29. The common difference of the AP is
(a) –2 (b) 3 (c) 2 (d) 5

13. Which term of the AP 2, –1, –4, –7, ……. is –40?
(a) 8th (b) 15th (c) 11th (d) 23rd

14. Which term of the AP 20, 17, 14,…… is the first negative term?
(a) 8th (b) 6th (c) 9th (d) 7th

15. The first, second and last terms of an AP are respectively 4, 7 and 31. How many terms are there in the given AP?
(a) 10 (b) 12 (c) 8 (d) 13

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 5
ARITHMETIC PROGRESSION

1. The common difference of the A. P. whose general term $a_n = 2n + 1$ is
(a) 1 (b) 2 (c) – 2 (d) – 1

2. The number of terms in the A.P. 2, 5, 8, …… , 59 is
(a) 12 (b) 19 (c) 20 (d) 25

3. The first positive term of the A.P. –11, –8, –5,…. Is
(a) 1 (b) 3 (c) – 2 (d) – 4

4. The 4^{th} term from the end of the A.P. 2, 5, 8, ,,,,,,35 is
(a) 29 (b) 26 (c) 23 (d) 20

5. The 11^{th} and 13^{th} terms of an A.P. are 35 and 41 respectively its common difference is
(a) 38 (b) 32 (c) 6 (d) 3

6. The next term of the A.P. $\sqrt{8}, \sqrt{18}, \sqrt{32}, ...$ is
(a) $5\sqrt{2}$ (b) $5\sqrt{3}$ (c) $3\sqrt{3}$ (d) $4\sqrt{3}$

7. If for an A.P. $a_5 = a_{10} = 5a$, then a_{15} is
(a) 71 (b) 72 (c) 76 (d) 81

8. Which of the following is not an A.P.?
(a) 1, 4, 7, …. (b) 3, 7, 12, 18, …..
(c) 11, 14, 17, 20, ……. (d) –5, –2, 1, 4,…

9. The sum of first 20 odd natural numbers is
(a) 281 (b) 285 (c) 400 (d) 421

10. The sum of first 20 natural numbers is
(a) 110 (b) 170 (c) 190 (d) 210

11. The sum of first 10 multiples of 7 is
(a) 315 (b) 371 (c) 385 (d) 406

12. If the sum of the A.P. 3, 7, 11, …. Is 210, the number of terms is
(a) 10 (b) 12 (c) 15 (d) 22

13. Write the next term of the AP $\sqrt{8}, \sqrt{18}, \sqrt{32}, ...$
(a) $\sqrt{50}$ (b) $\sqrt{64}$ (c) $\sqrt{36}$ (d) $\sqrt{72}$

14. Which term of the AP 21, 18, 15, …….. is zero?
(a) 8th (b) 6th (c) 9th (d) 7th

15. The sum of first 100 multiples of 5 is
(a) 50500 (b) 25250 (c) 500 (d) none of these

16. The sum of first 100 multiples of 9 is
(a) 90900 (b) 25250 (c) 45450 (d) none of these

17. The sum of first 100 multiples of 6 is
(a) 60600 (b) 30300 (c) 15150 (d) none of these

18. The sum of first 100 multiples of 4 is
(a) 40400 (b) 20200 (c) 10100 (d) none of these

19. The sum of first 100 multiples of 3 is
(a) 30300 (b) 15150 (c) 300 (d) none of these

20. The sum of first 100 multiples of 8 is
(a) 20200 (b) 80800 (c) 40400 (d) none of these

PRACTICE QUESTIONS
CLASS X : CHAPTER – 5
ARITHMETIC PROGRESSIONS
"nth term of A.P."

1. Determine the AP whose 3^{rd} term is 5 and the 7^{th} term is 9.

2. The 8^{th} term of an AP is 37 and its 12^{th} term is 57. Find the AP.

3. The 7^{th} term of an AP is – 4 and its 13^{th} term is – 16. Find the AP.

4. If the 10^{th} term of an AP is 52 and the 17^{th} term is 20 more than the 13^{th} term, find the AP.

5. If the 8^{th} term of an AP is 31 and its 15^{th} term is 16 more than the 11^{th} term, find the AP.

6. Check whether 51 is a term of the AP 5, 8, 11, 14, ……?

7. The 6th term of an AP is – 10 and its 10th term is – 26. Determine the 15^{th} term of the AP.

8. The sum of 4^{th} term and 8^{th} term of an AP is 24 and the sum of 6^{th} and 10^{th} terms is 44. Find the AP.

9. The sum of 5^{th} term and 9^{th} term of an AP is 72 and the sum of 7^{th} and 12^{th} terms is 97. Find the AP.

10. Find the 105^{th} term of the A.P. $4,\ 4\frac{1}{2},\ 5,\ 5\frac{1}{2},\ 6,\ldots\ldots$.

11. Find 25^{th} term of the AP $5, 4\frac{1}{2}, 4, 3\frac{1}{2}, 3, \ldots\ldots$

12. Find the 37^{th} term of the AP $6, 7\frac{3}{4}, 9\frac{1}{2}, 11\frac{3}{4}, \ldots\ldots$

13. Find 9^{th} term of the AP $\frac{3}{4}, \frac{5}{4}, \frac{7}{4}, \frac{9}{4}, \ldots\ldots\ldots\ldots$

14. An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29^{th} term.

15. Determine the AP whose third term is 16 and the 7th term exceeds the 5th term by 12.

16. The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

17. If the nth term of an AP is (5n – 2), find its first term and common difference. Also find its 19th term.

18. If the nth term of an AP is (4n – 10), find its first term and common difference. Also find its 16th term.

19. If 2x, x + 10, 3x + 2 are in A.P., find the value of x.

20. If x + 1, 3x and 4x + 2 are in AP, find the value of x.

21. Find the value of x for which (8x + 4), (6x – 2) and (2x + 7) are in AP.

22. Find the value of x for which (5x + 2), (4x – 1) and (x + 2) are in AP.

23. Find the value of m so that m + 2, 4m – 6 and 3m – 2 are three consecutive terms of an AP.

24. Find the 20th term from the last term of the AP : 3, 8, 13, . . ., 253.

25. Find the 11th term from the last term (towards the first term) of the AP : 10, 7, 4, . . ., – 62.

26. Find the 10th term from the last term of the AP : 4, 9 , 14, . . ., 254.

27. Find the 6^{th} term from the end of the AP 17, 14, 11, …… (–40).

28. Find the 8^{th} term from the end of the AP 7, 10, 13, …… 184.

29. Find the 10th term from the last term of the AP : 8, 10, 12, . . ., 126.

30. Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.

31. If the 3rd and the 9th terms of an AP are 4 and –8 respectively, which term of this AP is zero?

32. Two APs have the same common difference. The difference between their 100th terms is 100, what is the difference between their 1000th terms?

33. For what value of *n*, are the *n*th terms of two APs: 63, 65, 67, . . . and 3, 10, 17, . . . equal?

34. For what value of *n*, are the *n*th terms of two APs: 13, 19, 25, . . . and 69, 68, 67, . . . equal?

35. The 8^{th} term of an AP is zero. Prove that its 38^{th} tem is triple its 18^{th} term.

36. The 4^{th} term of an AP is 0. Prove that its 25^{th} term is triple its 11^{th} term.

37. If the mth term of an AP be $\frac{1}{n}$ and its nth term be $\frac{1}{m}$, then show that its (mn)th terms is 1.

38. If m times the mth term of an AP is equal to n times the nth term and $m \neq n$, show that its (m + n)th term is 0.

39. If the pth term of an AP is q and qth term of an AP is p, prove that its nth is (p + q – n).

40. If the pth, qth and rth terms of an AP is a, b, c respectively, then show that a(q – r) + b(r – p) + c(p – q) = 0.

41. If the pth, qth and rth terms of an AP is a, b, c respectively, then show that p(b – c) + q(c – a) + r(a – b) = 0.

42. If the nth term of a progression be a linear expression in n, then prove that this progression is an AP.

43. The sum of three numbers in AP is 21 and their product is 231. Find the numbers.

44. The sum of three numbers in AP is 27 and their product is 405. Find the numbers.

45. The sum of three numbers in AP is 15 and their product is 80. Find the numbers.

46. Find three numbers in AP whose sum is 3 and product is – 35.

47. Divide 24 in three parts such that they are in AP and their product is 440.

48. The sum of three consecutive terms of an AP is 21 and the sum of the squares of these terms is 165. Find the terms.

49. Find four numbers in AP whose sum is 20 and the sum of whose squares is 120.

50. Find four numbers in AP whose sum is 28 and the sum of whose squares is 216.

51. Find four numbers in AP whose sum is 50 and in which the greatest number is 4 times the least.

52. The angles of a quadrilateral are in AP whose common difference is 10^0. Find the angles.

53. Show that $(a - b)^2$, $(a^2 + b^2)$ and $(a + b)^2$ are in AP.

54. If 10^{th} times the 10^{th} term of an AP is equal to 15 times the 15^{th} term, show that its 25^{th} term is 0.

55. If 5 times the 5^{th} term of an AP is equal to 8 times its 8^{th} term, show that the 13^{th} term is 0.

56. How many terms are there in the AP 7, 11, 15, ….. , 139?

57. How many terms are there in A.P. 7,11,15,……..139?

58. How many terms are there in the AP 6, 10, 14, 18, ….. 174.

59. How many three-digit numbers are divisible by 7?

60. How many multiples of 7 between 50 and 500?

61. How many multiples of 4 lie between 10 and 250?

62. How many terms are there in the AP 41, 38, 35, …… , 8.

63. Which term of the AP : 3, 8, 13, 18, . . . ,is 78?

64. Which term of the A.P. 5, 13, 21, …….. is 181?

65. Which term of the A.P. 5, 9, 13, 17,…….. is 81?

66. Which term of the AP 3, 8, 13, 18,…… will be 55 more than its 20^{th} term?

67. Which term of the AP 8, 14, 20, 26,…. will be 72 more than its 41^{st} term?

68. Which term of the AP 9, 12, 15, 18,…. will be 39 more than its 36^{th} term?

69. Which term of the AP 3, 15, 27, 39,…. will be 120 more than its 21^{st} term?

70. Which term of the AP 24, 21, 18, 15, …. Is first negative term?

71. Which term of the AP 3, 8, 13, 18, …… is 88?

72. Which term of the AP 72, 68, 64, 60, …… is 0?

73. Which term of the AP : 3, 15, 27, 39, . . . will be 132 more than its 54th term?

74. Which term of the AP $\frac{5}{6}, 1, 1\frac{1}{6}, 1\frac{1}{3}, ...$ is 3 ?

75. A sum of Rs. 1000 is invested at 8% simple interest per year. Calculate the interest at the end of each year. Does this interest form an AP? If so, find the interest at the end of 30 years.

76. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?

77. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

78. Manish saved Rs. 50 in the first week of the year and then increased his weekly savings by Rs. 17.50 each week. In what week will his weekly savings be Rs. 207.50?

79. Subba Rao started work in 1995 at an annual salary of Rs 5000 and received an increment of Rs 200 each year. In which year did his income reach Rs 7000?

80. Ramkali saved Rs 5 in the first week of a year and then increased her weekly savings by Rs 1.75. If in the *n*th week, her weekly savings become Rs 20.75, find *n*.

PRACTICE QUESTIONS
CLASS X : CHAPTER – 5
ARITHMETIC PROGRESSIONS
"SUM OF n TERMS OF AN A.P."

1. Find the sum of first 24 terms of the AP 5, 8, 11, 14,…….

2. Find the sum: 25 + 28 + 31 +…….. + 100.

3. Find the sum of first 21 terms of the AP whose 2^{nd} term is 8 and 4^{th} term is 14.

4. If the nth term of an AP is (2n + 1), find the sum of first n terms of the AP.

5. Find the sum of first 25 terms of an AP whose nth term is given by (7 – 3n).

6. Find the sum of all two-digit odd positive numbers.

7. Find the sum of all natural number between 100 and 500 which are divisible by 8.

8. Find the sum of all three digit natural numbers which are multiples of 7.

9. How many terms of the AP 3, 5, 7, 9,… must be added to get the sum 120?

10. If the sum of first n, 2n and 3n terms of an AP be S_1, S_2 and S_3 respectively, then prove that $S_3 = 3(S_2 - S_1)$.

11. If the sum of the first m terms of an AP be n and the sum of first n terms be m then show that the sum of its first (m + n) terms is –(m + n).

12. If the sum of the first p terms of an AP is the same as the sum of first q terms (where $p \neq q$) then show that the sum of its first (p + q) terms is 0.

13. If the pth term of an AP is $\frac{1}{q}$ and its qth term is $\frac{1}{p}$, show that the sum of its first pq terms is $\frac{1}{2}(p+q)$.

14. Find the sum of all natural numbers less than 100 which are divisible by 6.

15. Find the sum of all natural number between 100 and 500 which are divisible by 7.

16. Find the sum of all multiples of 9 lying between 300 and 700.

17. Find the sum of all three digit natural numbers which are divisible by 13.

18. Find the sum of 51 terms of the AP whose second term is 2 and the 4^{th} term is 8.

19. The sum of n terms of an AP is $(5n^2 - 3n)$. Find the AP and hence find its 10^{th} term.

20. The first and last terms of an AP are 4 and 81 respectively. If the common difference is 7, how many terms are there in the AP and what is their sum?

21. If the sum of first 7 terms of AP is 49 and that of first 17 terms is 289, find the sum of first n terms.

22. Find the sum of the first 100 even natural numbers which are divisible by 5.

23. Find the sum of the following: $\left(1-\frac{1}{n}\right)+\left(1-\frac{2}{n}\right)+\left(1-\frac{3}{n}\right)$..... upto n terms.

24. If the 5^{th} and 12^{th} terms of an AP are – 4 and – 18 respectively, find the sum of first 20 terms of the AP.

25. The sum of n terms of an AP is $\left(\frac{5n^2}{2}+\frac{3n}{2}\right)$. Find its 20^{th} term

26. The sum of n terms of an AP is $\left(\frac{3n^2}{2}+\frac{5n}{2}\right)$. Find its 25^{th} term

27. Find the number of terms of the AP 18, 15, 12, ……. so that their sum is 45. Explain the double answer.

28. Find the number of terms of the AP 64, 60, 56, ……. so that their sum is 544. Explain the double answer.

29. Find the number of terms of the AP 17, 15, 13, ……. so that their sum is 72. Explain the double answer.

30. Find the number of terms of the AP 63, 60, 57, ……. so that their sum is 693. Explain the double answer.

31. The sum of first 9 terms of an AP is 81 and the sum of its first 20 terms is 400. Find the first term and the common difference of the AP.

32. If the nth term of an AP is (4n + 1), find the sum of the first 15 terms of this AP. Also find the sum of is n terms.

33. The sum of the first n terms of an AP is given by $S_n = (2n^2 + 5n)$. Find the nth term of the AP.

34. If the sum of the first n terms of an AP is given by $S_n = (3n^2 – n)$, find its 20^{th} term.

35. If the sum of the first n terms of an AP is given by $S_n = (3n^2 + 2n)$, find its 25^{th} term.

36. How many terms of the AP 21, 18, 15,…. Must be added to get the sum 0?

37. Find the sum of first 24 terms whose nth term is given by $a_n = 3 + 2n$.

38. How many terms of the AP –6, $\frac{-11}{2}$, –5, ……. are needed to give the sum -25? Explain the double answer.

39. Find the sum of first 24 terms of the list of numbers whose *n*th term is given by $a_n = 3 + 2n$

40. How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?

41. Find the sum of the first 40 positive integers divisible by 6.

42. Find the sum of all the two digit numbers which are divisible by 4.

43. Find the sum of all two digits natural numbers greater than 50 which, when divided by 7 leave remainder of 4.

44. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289 , find the sum of first n terms

45. If the sum of first n terms of an A.P. is given by $S_n = 3n^2 + 5n$, find the nth term of the A.P.

46. The sum of first 8 terms of an AP is 100 and the sum of its first 19 terms is 551. Find the AP.

47. How many terms are there in A.P. whose first terms and 6^{th} term are –12 and 8 respectively and sum of all its terms is 120?

48. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row,18 in the row next to it and so on. In how may rows are the 200 logs placed and how many logs are in the top row?

49. A man repays a loan of Rs. 3250 by paying Rs. 20 in the first month and then increase the payment by Rs. 15 every month. How long will it take him to clear the loan?

50. Raghav buys a shop for Rs. 1,20,000. He pays half of the amount in cash and agrees to pay the balance in 12 annual installments of Rs. 5000 each. If the rate of interest is 12% and he pays with the installment the interest due on the unpaid amount, find the total cost of the shop.

51. A sum of Rs. 280 is to be used to give four cash prizes to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceding prize, find the value of each of the prizes.

52. A sum of Rs 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. If each prize is Rs 20 less than its preceding prize, find the value of each of the prizes.

53. A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs 200 for the first day, Rs 250 for the second day, Rs 300 for the third day, etc., the penalty for each succeeding day being Rs 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?

54. A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find : (i) the production in the 1st year (ii) the production in the 10th year (iii) the total production in first 7 years

55. How many terms of the AP : 9, 17, 25, . . . must be taken to give a sum of 636?

56. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

57. The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?

58. Find the sum of first 22 terms of an AP in which $d = 7$ and 22nd term is 149.

59. Find the sum of first 51 terms of an AP whose second and third terms are 14 and 18 respectively.

60. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.

61. Show that $a_1, a_2, \ldots, a_n, \ldots$ form an AP where a_n is defined as below : (i) $a_n = 3 + 4n$ (ii) $a_n = 9 - 5n$ Also find the sum of the first 15 terms in each case.

62. If the sum of the first n terms of an AP is $4n - n2$, what is the first term (that is S1)? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the nth terms.

63. Find the sum of the first 15 multiples of 8.

64. Find the sum of the odd numbers between 0 and 50.

65. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students?

66. A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm, ... What is the total length of such a spiral made up of thirteen consecutive semicircles? (Take $\pi = 22/7$)

MCQ WORKSHEET-I
CLASS X: CHAPTER – 7
COORDINATE GEOMETRY

1. The points A(0, –2), B(3, 1), C(0, 4) and D(–3, 1) are the vertices of a
(a) parallelogram (b) rectangle (c) square (d) rhombus

2. If A(3, 8), B(4, –2) and C(5, –1) are the vertices of ΔABC. Then, its area is
(a) $28\frac{1}{2}$ sq. units (b) $37\frac{1}{2}$ sq. units (c) 57 sq. units (d) 75 sq. units

3. The points A(0, 6), B(–5, 3) and C(3, 1) are the vertices of a triangle which is
(a) isosceles (b) equilateral (c) scalene (d) right angled

4. Two vertices of ΔABC are A(–1, 4) and B(5, 2) and its centroid is G(0, –3). The coordinate of C is
(a) (4, 3) (b) (4, 15) (c) (–4, –15) (d) (–15, –4)

5. The coordinates of the centroid of ΔABC with vertices A(–1, 0), B(5, –2) and C(8, 2) is
(a) (12, 0) (b) (6, 0) (c) (0, 6) (d) (4, 0)

6. If the points A(2, 3), B(5, k) and C(6, 7) are collinear, then the value of k is
(a) 4 (b) 6 (c) $\frac{-3}{2}$ (d) $\frac{11}{4}$

7. If P(–1, 1) is the middle point of the line segment joining A(–3, b) and B(1, b + 4) then the value of b is
(a) 1 (b) –1 (c) 2 (d) 0

8. y–axis divides the join of P(–4, 2) and Q(8, 3) in the ratio
(a) 3 : 1 (b) 1 : 3 (c) 2 : 1 (d) 1 : 2

9. x–axis divides the join of A(2, –3) and B(5, 6) in the ratio
(a) 3 : 5 (b) 2 : 3 (c) 2 : 1 (d) 1 : 2

10. The point P(1, 2) divides the join of A(–2, 1) and B(7, 4) are in the ratio of
(a) 3 : 2 (b) 2 : 3 (c) 2 : 1 (d) 1 : 2

11. A point P divides the join of A(5, –2) and B(9, 6) are in the ratio 3 : 1. The coordinates of P are
(a) (4, 7) (b) (8, 4) (c) $(\frac{11}{2}, 5)$ (d) (12, 8)

12. What point on x – axis is equidistant from the points A(7, 6) and B(–3, 4)?
(a) (0, 4) (b) (–4, 0) (c) (3, 0) (d) (0, 3)

13. The distance of the point P(4, –3) from the origin is
(a) 1 unit (b) 7 units (c) 5 units (d) 3 units

14. The distance between the points A(2, –3) and B(2, 2) is
(a) 2 units (b) 4 units (c) 5 units (d) 3 units

15. Find the area of the triangle whose vertices are A(1, 2), B(–2, 3) and C(–3, –4)
(a) 11sq. units (b) 22 sq. units (c) 7 sq. units (d) 6.5 sq. units

MCQ WORKSHEET-II
CLASS X: CHAPTER – 7
COORDINATE GEOMETRY

1. Find the area of the triangle whose vertices are A(2, 4), B(–3, 7) and C(–4, 5)
(a) 11sq. units (b) 22 sq. units (c) 7 sq. units (d) 6.5 sq. units

2. Find the area of the triangle whose vertices are A(10, –6), B(2, 5) and C(–1, 3)
(a) 12.5 sq. units (b) 24.5 sq. units (c) 7 sq. units (d) 6.5 sq. units

3. Find the area of the triangle whose vertices are A(4, 4), B(3, –16) and C(3, –2)
(a) 12.5 sq. units (b) 24.5 sq. units (c) 7 sq. units (d) 6.5 sq. units

4. For what value of x are the points A(–3, 12), B(7, 6) and C(x, 9) collinear?
(a) 1 (b) –1 (c) 2 (d) –2

5. For what value of y are the points A(1, 4), B(3, y) and C(–3, 16) collinear?
(a) 1 (b) –1 (c) 2 (d) –2

6. Find the value of p for which the points A(–1, 3), B(2, p) and C(5, –1) collinear?
(a) 1 (b) –1 (c) 2 (d) –2

7. What is the midpoint of a line with endpoints (–3, 4) and (10, –5)?
(a) (–13, –9) (b) (–6.5, –4.5) (c) (3.5, –0.5) (d) none of these

8. A straight line is drawn joining the points (3, 4) and (5,6). If the line is extended, the ordinate of the point on the line, whose abscissa is –1 is
(a) 1 (b) –1 (c) 2 (d) 0

9. If the distance between the points (8, p) and (4, 3) is 5 then value of p is
(a) 6 (b) 0 (c) both (a) and (b) (d) none of these

10. The fourth vertex of the rectangle whose three vertices taken in order are (4,1), (7, 4), (13, –2) is
(a) (10, –5) (b) (10, 5) (c) (8, 3) (d) (8, –3)

11. If four vertices of a parallelogram taken in order are (–3, –1), (a, b), (3, 3) and (4, 3). Then a : b =
(a) 1 : 4 (b) 4 : 1 (c) 1 : 2 (d) 2 : 1

12. Area of the triangle formed by (1, – 4), (3, – 2) and (– 3,16) is
(a) 40 sq. units (b) 48 sq. units (c) 24 sq. units (d) none of these

13. The points (2, 5), (4, - 1), (6, - 7) are vertices of an _____ triangle
(a) isosceles (b) equilateral (c) scalene (d) right angled

14. The area of triangle formed by the points (p, 2 - 2p), (l-p,2p) and (-4-p, 6- 2p) is 70 sq. units. How many integral value of p are possible ?
(a) 2 (b) 3 (c) 4 (d) none of these

15. If the origin is the mid-point of the line segment joined by the points (2,3) and (x,y), then the value of (x,y) is
(a) (2, –3) (b) (2, 3) (c) (–2, 3) (d) (–2, –3)

MCQ WORKSHEET-III
CLASS X: CHAPTER – 7
COORDINATE GEOMETRY

1. The distance of the point P(2, 3) from the x-axis is:
(a) 2 (b) 3 (c) 1 (d) 5

2. The distance between the points A(0, 6) and B(0, -2) is:
(a) 2 (b) 6 (c) 4 (d) 8

3. The distance of the point P(-6, 8) from the origin is:
(a) 8 (b) 27 (c) 10 (d) 6

4. The distance between the points (0, 5) and (-5, 0) is:
(a) 5 (b) 52 (c) 25 (d) 10

5. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). The length of its diagonal is:
(a) 5 (b) 3 (c) 34 (d) 4

6. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is:
(a) 5 (b) 12 (c) 11 (d) 7 + 5

7. The area of a triangle with vertices A(3, 0), B(7, 0) and C(8, 4) is:
(a) 14 (b) 28 (c) 8 (d) 6

8. The points (–4, 0), (4, 0), (0, 3) are the vertices of a :
(a) Right triangle (b) Isosceles triangle (c) Equilateral triangle (d) Scalene triangle

9. Point on x – axis has coordinates:
(a) (a, 0) (b) (0, a) (c) (–a, a) (d) (a, –a)

10. Point on y – axis has coordinates:
(a) (–a, b) (b) (a, 0) (c) (0, b) (d) (–a, –b)

11. Line formed by joining (- 1,1) and (5, 7) is divided by a line x + y = 4 in the ratio of
(a) 1 : 4 (b) 1 : 3 (c) 1 : 2 (d) 3 : 4

12. If the area of the triangle with vertices (x, 0), (1,1) and (0, 2) is 4 square units, then a value of x is
(a) –2 (b) –4 (c) –6 (d) 8

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 7
COORDINATE GEOMETRY

1. Point A(–5, 6) is at a distance of:
(a) 61 units from the origin (b) 11 units from the origin
(c) $\sqrt{61}$ units from the origin (d) $\sqrt{11}$ units from the origin

2. If the points (1, x), (5, 2) and (9, 5) are collinear then the value of x is
(a) $\frac{5}{2}$ (b) $\frac{-5}{2}$ (c) –1 (d) 1

3. The end points of diameter of circle are (2, 4) and (–3, –1). The radius of the circle us
(a) $\frac{5\sqrt{2}}{2}$ (b) $5\sqrt{2}$ (c) $3\sqrt{2}$ (d) $\frac{\pm 5\sqrt{2}}{2}$

4. The ratio in which x – axis divides the line segment joining the points (5, 4) and (2, –3) is:
(a) 5 : 2 (b) 3 : 4 (c) 2 : 5 (d) 4 : 3

5. The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1:2 internally lies in the
(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

6. The point which lies on the perpendicular bisector of the line segment joining the points A(–2, –5) and B(2, 5) is:
(a) (0, 0) (b) (0, 2) (c) (2, 0) (d) (–2, 0)

7. The fourth vertex D of a parallelogram ABCD whose three vertices are A(-2, 3), B(6, 7) and C(8, 3) is:
(a) (0, 1) (b) (0, -1) (c) (-1, 0) (d) (1, 0)

8. If the point P(2, 1) lies on the line segment joining points A(4, 2) and B(8, 4), then
(a) AP = $\frac{1}{3}$AB (b) AP = PB (c) PB = $\frac{1}{3}$AB (d) AP = $\frac{1}{2}$AB

9. Three vertices of a parallelogram taken in order are (- 1, - 6), (2, - 5) and (7, 2). The fourth vertex is
(a) (1, 4) (b) (1, 1) (c) (4, 4) (d) (4, 1)

10. If A and B are the points (- 3, 4) and (2,1) respectively, then the coordinates of the points on AB produced such that AC = 2BC are
(a) (2, 4) (b) (3, 7) (c) (7, –2) (d) none of these

11. Distance of the point (4, a) from x-axis is half its distance from y-axis then a =
(a) 2 (b) 8 (c) 4 (d) 6

12. A triangle is formed by the points 0(0, 0), A(5,0) and B(0,5). The number of points having integral coordinates (both x and y) and strictly inside the triangle is
(a) 10 (b) 17 (c) 16 (d) 6

13. If P(l, 2), Q(4,6), R(5,7) and S(a, b) are the vertices of a parallelogram PQRS then
(a) a = 2, b = 4 (b) a = 3, b = 4 (c) a = 2, b = 3 (d) a = 3, b = 5

14. The number of points on x-axis which are at a distance of 2 units from (2, 4) is
(a) 2 (b) 1 (c) 3 (d) 0

15. The distance of the point (h, k) from x-axis is
(a) h (b) k (c) | h | (d) | k |

16. The vertices of a triangle are (0, 0), (3, 0) and (0, 4). Its orthocentre is at
(a) (0, 3) (b) (4, 0) (c) (0, 0) (d) (3, 4)

17. The area of the triangle with vertices at the points (a, b + c), (b, c + a) and (c, a + b) is
(a) a + b + c (b) a + b – c (c) a – b + c (d) 0

18. If the segment joining the points (a, b) and (c, d) subtends a right angle at the origin, then
(a) ac – bd = 0 (b) ac + bd = 0 (c) ab – cd = 0 (d) ab + cd = 0

19. The distance of A(5, -12) from the origin is
(a) 12 (b) 11 (c) 13 (d) 10

20. Find the ordinate of a point whose abscissa is 10 and which is at a distance of 10 units from the point P(2, -3).
(a) 3 (b) –9 (c) both (a) or (b) (d) none of these

PRACTICE QUESTIONS
CLASS X : CHAPTER – 7
COORDINATE GEOMETRY
DISTANCE FORMULA

1. Find the distance between the following points:
(i) A(9, 3) and (15, 11) (ii) A(7, – 4) and b(–5, 1).
(iii) A(–6, –4) and B(9, –12) (iv) A(1, –3) and B(4, –6)
(v) P(a + b, a – b) and Q(a – b, a + b)
(vi) P(a sinα, a cosα) and Q(a cosα, –asinα)

2. If A(6, –1), B(1, 3) and C(k, 8) are three points such that AB= BC, find the value of k.

3. Find all the possible value of a for which the distance between the points A(a, –1) and B(5, 3) is 5 units.

4. Determine, whether each of the given points (–2, 1), (2, –2) and (5, 2) are the vertices of right angle.

5. Determine if the points (1, 5), (2, 3) and (– 2, – 11) are collinear.

6. By distance formula, show that the points (1, –1), (5, 2) and (9, 5) are collinear.

7. Find the value of *k* if the points A(2, 3), B(4, *k*) and C(6, –3) are collinear.

8. Find a relation between *x* and *y* if the points (*x*, *y*), (1, 2) and (7, 0) are collinear.

9. Find the point on x-axis which is equidistant from (–2, 5) and (2, –3).

10. Find the point on x-axis which is equidistant from (7, 6) and (–3, 4).

11. Find the point on the *x*-axis which is equidistant from (2, –5) and (–2, 9).

12. Find a point on the *y*-axis which is equidistant from the points A(6, 5) and B(– 4, 3).

13. Find a point on the *y*-axis which is equidistant from the points A(5, 2) and B(– 4, 3).

14. Find a point on the *y*-axis which is equidistant from the points A(5, – 2) and B(– 3, 2).

15. Find the point on y-axis, each of which is at a distance of 13 units from the point (–5, 7).

16. Find the point on x-axis, each of which is at a distance of 10 units from the point (11, –8).

17. Find the values of k for which the distance between the points A(k, –5) and B(2, 7) is 13 units.

18. Prove that the points A(–3, 0), B(1, –3) and C(4, 1) are the vertices of an isosceles right-angled triangle. Find the area of this triangle.

19. Prove that the points A(a, a), B(–a, –a) and C($-\sqrt{3}$ a, $\sqrt{3}$ a) are the vertices of an equilateral triangle. Calculate the area of this triangle.

20. If the distance of P(x, y) from A(5, 1) and B(–1, 5) are equal. Prove that 3x = 2y.

21. Show that the points A(1, 2), B(5, 4), C(3, 8) and D(–1, 6) are vertices of a square.

22. Show that the points A(5, 6), B(1, 5), C(2, 1) and D(6, 2) are vertices of a square.

23. Show that the points A(0, –2), B(3, 1), C(0, 4) and D(–3, 1) are vertices of a square. Also find its area.

24. Show that the points A(6, 2), B(2, 1), C(1, 5) and D(5, 6) are vertices of a square. Also find its area.

25. Show that the points A(–4, –1), B(–2, –4), C(4, 0) and D(2, 3) are vertices of a rectangle. Also find its area.

26. Prove that the points A(2, –2), B(14, 10), C(11, 13) and D(–1, 1) are vertices of a rectangle. Find the area of this rectangle.

27. Show that the points A(1, –3), B(13, 9), C(10, 12) and D(–2, 0) are vertices of a rectangle.

28. Show that the points A(1, 0), B(5, 3), C(2, 7) and D(–2, 4) are vertices of a rhombus.

29. Prove that the points A(2, –1), B(3, 4), C(–2, 3) and D(–3, –2) are vertices of a rhombus. Find the area of this rhombus.

30. Show that the points A(–3, 2), B(–5, –5), C(2, –3) and D(4, 4) are vertices of a rhombus. Find the area of this rhombus.

31. Prove that the points A(–2, –1), B(1, 0), C(4, 3) and D(1, 2) are vertices of a parallelogram.

32. Find the area of a rhombus if its vertices are (3, 0), (4, 5), (– 1, 4) and (– 2, – 1) taken in order.

33. Find the coordinates of the circumcentre of a triangle whose vertices are A(4, 6), B(0, 4) and C(6, 2). Also, find its circumradius.

34. Find the coordinates of the circumcentre of a triangle whose vertices are A(3, 0), B(–1, –6) and C(4, –1). Also, find its circumradius.

35. Find the coordinates of the circumcentre of a triangle whose vertices are A(8, 6), B(8, –2) and C(2, –2). Also, find its circumradius.

36. Find the coordinates of the centre of a circle passing through the points A(2, 1), B(5, –8) and C(2, –9). Also find the radius of this circle.

37. Find the coordinates of the centre of a circle passing through the points A(–2, –3), B(–1, 0) and C(7, –6). Also find the radius of this circle.

38. Find the coordinates of the centre of a circle passing through the points A(1, 2), B(3, –4) and C(5, –6). Also find the radius of this circle.

39. Find the coordinates of the centre of a circle passing through the points A(0, 0), B(–2, 1) and C(–3, 2). Also find the radius of this circle.

40. Find the centre of a circle passing through the points (6, – 6), (3, – 7) and (3, 3).

41. Find the coordinates of the point equidistant from three given points A(5, 3), B(5, –5) and C(1, –5).

42. If the points A(6, 1), B(8, 2), C(9, 4) and D(*p*, 3) are the vertices of a parallelogram, taken in order, find the value of *p*.

43. Find a relation between *x* and *y* such that the point (*x* , *y*) is equidistant from the points (7, 1) and (3, 5).

44. Check whether (5, – 2), (6, 4) and (7, – 2) are the vertices of an isosceles triangle.

45. Find the values of *y* for which the distance between the points P(2, – 3) and Q(10, *y*) is 10 units.

46. If Q(0, 1) is equidistant from P(5, –3) and R(*x*, 6), find the values of *x*. Also find the distances QR and PR.

47. If two vertices of an equilateral triangle be O(0, 0) and A(3, $\sqrt{3}$), find the coordinates of its third vertex.

48. The two opposite vertices of a square are (–1, 2) and (3, –2). Find the coordinates of the other two vertices.

49. The two opposite vertices of a square are (1, –6) and (5, 4). Find the coordinates of the other two vertices.

50. Prove that the points A(7, 10), B(–2, 5) and C(3, –4) are the vertices of an isosceles right triangle.

51. Show that the points A(–5, 6), B(3, 0) and C(9, 8) are the vertices of an isosceles right angled triangle. Find the area of this triangle.

52. Show that the points A(2, 1), B(5, 2), C(6, 4) and D(3, 3) are the angular points of parallelogram. Is this figure a rectangle?

53. Show that the points O(0, 0), A(3, $\sqrt{3}$) and B(3, $-\sqrt{3}$) are the vertices of an equilateral triangle. Find the area of this triangle.

54. Prove that the points A(3, 0), B(6, 4) and C(–1, 3) are the vertices of a right triangle. Also prove that these are vertices of an isosceles triangle.

55. If P and Q are two points whose coordinates are (at^2, 2at) and $\left(\frac{a}{t^2}, \frac{2a}{t}\right)$ respectively and S is the point (a, 0). Show that $\frac{1}{SP}+\frac{1}{SQ}$ is independent of t.

56. If the points A(4, 3) and B(x, 5) are on the circle with centre O(2, 3), find the value of x.

57. Find the relation between x and y if point P(x, y) lies on the perpendicular bisector of the line joining the points (3, 6) and (–3, 4).

58. Find the relation between x and y if point P(x, y) lies on the perpendicular bisector of the line joining the points (7, 1) and (3, 5).

59. If A, B and P are the points (–4, 3), (0, –2) and (α, β) respectively and P is equidistant from A and B, show that $8\alpha - 10\beta + 21 = 0$.

60. If the points (5, 4) and (x, y) are equidistant from the point (4, 5), prove that $x^2 + y^2 - 8x - 10y + 39 = 0$.

61. Find the coordinates of the point whish is at a distance of 2 units from (5, 4) and 10 units from (11, –2).

62. If two vertices of an equilateral triangle are (0, 0) and (3, 0), find the third vertex.

63. The centre of a circle is (2α–1, 3α+1) and it passes through the point (–3, –1). If a diameter of the circle is of length 20 units, find the value of α.

64. If the point P(x, y) is equidistant from the points A(5, 1) and B(–1, 5), prove that x = y.

65. Find the value of k if the point P(0, 2) is equidistant from (3, k) and (k, 5).

66. Let the opposite angular points of a square be (3, 4) and (1, –1). Find the coordinates of the remaining angular points.

67. Prove that the points (2x, 4a), (2a, 6a) and ($2a + \sqrt{3}a$, 5a) are the vertices of an equilateral triangle.

68. An equilateral triangle has two vertices at the points (3, 4) and (–2, 3), find the coordinates of the third vertex.

69. Two vertex of an isosceles triangle are (2, 0) and (2, 5). Find the third vertex if the length of the equal sides is 3.

70. The coordinates of the point P are (–3, 2). Find the coordinates of the point Q which lies on the line joining P and origin such that OP = OQ.

PRACTICE QUESTIONS
CLASS X : CHAPTER – 7
COORDINATE GEOMETRY
SECTION FORMULA

1. Find the coordinates of the point which divides the line segment joining the points A(4, –3) and B(9, 7) in the ration 3 : 2.

2. Find the coordinates of the point which divides the line segment joining the points A(–1, 7) and B(4, –3) in the ration 2 : 3.

3. Find the coordinates of the point which divides the line segment joining the points A(–5, 11) and B(4, –7) in the ration 7 : 2.

4. Find the coordinates of the midpoint of the line segment joining the points A(–5, 4) and B(7, –8)

5. Find the coordinates of the midpoint of the line segment joining the points A(3, 0) and B(5, 4)

6. Find the coordinates of the midpoint of the line segment joining the points A(–11, –8) and B(8, –2).

7. The coordinates of the midpoint of the line segment joining the points A(2p + 1, 4) and B(5, q–1) are(2p, q). Find the value of p and q.

8. The midpoint of the line segment joining A(2a, 4) and B(–2, 3b) is M(1, 2a + 1). Find the values of a and b.

9. Find the coordinates of the points which divide the line segment joining the points (–2, 0) and (0, 8) in four equal parts.

10. Find the coordinates of the points which divide the line segment joining the points (–2, 2) and (2, 8) in four equal parts.

11. In what ratio does the points P(2,–5) divide the line segment joining A(–3, 5) and B(4, –9).

12. In what ratio does the points P(2, 5) divide the line segment joining A(8, 2) and B(–6, 9).

13. Find the coordinates of the points of trisection of the line segment joining the points (4, –1) and (–2, –3).

14. The line segment joining the points (3, –4) and (1, 2) is trisected at the points P(p, –2) and Q($\frac{5}{3}$, q). Find the values of p and q.

15. The coordinate of the midpoint of the line joining the point (3p, 4) and (–2, 2q) are (5, p). Find the value of p and q.

16. The consecutive vertices of a parallelogram ABCD are A(1, 2), B(1, 0) and C(4, 0). Find the fourth vertex D.

17. Find the lengths of the median of the triangle whose vertices are (1, –1), (0, 4) and (–5, 3).

18. Prove that the diagonal of a rectangle bisects each other and are equal.

19. Find the ratio in which the point (11, 15) divides the line segment joining the point (15, 5) and (9, 20).

20. Find the ratio in which the point P(m, 6) divides the line segment joining the point A(–4, 3) and B(2, 8). Also find the value of m.

21. If two vertices of ΔABC are A(3, 2), B(–2, 1) and its centroid G has the coordinate (5/3, –1/3). Find the coordinates of the third vertex.

22. The coordinate of the midpoint of the line joining the point (2p, 4) and (–2, 2q) are (3, p). Find the value of p and q.

23. Show that the points A(3, 1), B(0, –2), C(1, 1) and D(4, 4) are the vertices of a parallelogram ABCD.

24. If the points P(a, –11), Q(5, b), R(2, 15) and S(1, 1) are the vertices of a parallelogram PQRS, find the value of a and b.

25. If three consecutive vertices of a parallelogram ABCD are A(1, –2), B(3, 6) and C(5, 10). Find the fourth vertex D.

26. In what ratio does the point (– 4, 6) divide the line segment joining the points A(– 6, 10) and B(3, – 8)?

27. Find the coordinates of the points of trisection of the line segment joining the points A(2, – 2) and B(– 7, 4).

28. Find the ratio in which the *y*-axis divides the line segment joining the points (5, – 6) and (–1, – 4). Also find the point of intersection.

29. If the points A(6, 1), B(8, 2), C(9, 4) and D(*p*, 3) are the vertices of a parallelogram, taken in order, find the value of *p*.

30. If the points A(–2, –1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram, taken in order, find the value of *a and b*.

31. Find the ratio in which the point P(–6, a) divides the join of A(–3, –1) and B(–8, 9). Also, find the value of a.

32. Find the ratio in which the point P(–3, a) divides the join of A(–5, –4) and B(–2, 3). Also, find the value of a.

33. Find the ratio in which the point P(a, 1) divides the join of A(–4, 4) and B(6, –1). Also, find the value of a.

34. Find the ratio in which the line segment joining the points (– 3, 10) and (6, – 8) is divided by (– 1, 6).

35. Find the ratio in which the line segment joining A(1, – 5) and B(– 4, 5) is divided by the *x*-axis. Also find the coordinates of the point of division.

36. In what ratio is the line segment joining A(6, –3) and B(–2, –5) is divided by the *x*-axis. Also find the coordinates of the point of intersection of AB and the x-axis.

37. In what ratio is the line segment joining A(2, –3) and B(5, 6) is divided by the *x*-axis. Also find the coordinates of the point of intersection of AB and the x-axis.

38. In what ratio is the line segment joining A(–2, –3) and B(3, 7) is divided by the *y*-axis. Also find the coordinates of the point of intersection of AB and the y-axis.

39. The coordinates of one end point of a diameter AB of a circle are A(4, –1) and the coordinates of the centre of the circle are C(1, –3).

40. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, – 3) and B is (1, 4).

41. The line segment joining A(–2, 9) and B(6, 3) is a diameter of a circle with centre C. Find the coordinates of C.

42. AB is a diameter of a circle with centre C(–1, 6). If the coordinates of A are (–7, 3), find the coordinates of B.

43. Find the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points A(2, –2) and B(3, 7).

44. Find the ratio in which the line $x - y - 2 = 0$ divides the line segment joining the points A(3, –1) and B(8, 9).

45. Find the ratio in which the line $3x + 4y - 9 = 0$ divides the line segment joining the points A(1, 3) and B(2, 7).

46. Find the lengths of the medians of a triangle ABC whose vertices are A(7, –3), B(5, 3) and C(3, –1).

47. Find the lengths of the medians of a triangle ABC whose vertices are A(0, –1), B(2, 1) and C(0,3).

48. Let D(3, –2), E(–3, 1) and F(4, –3) be the midpoints of the sides BC, CA and AB respectively of ΔABC. Then, find the coordinates if the vertices A, B and C.

49. If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that AP = $\frac{3}{7}$ AB and P lies on the line segment AB.

50. A(1, 1) and B(2, –3) are two points. If C is a point lying on the line segment AB such that CB = 2AC, find the coordinates of C

51. If A(1, 1) and B(–2, 3) are two points and C is a point on AB produced such that AC = 3AB, find the coordinates of C.

52. Find the coordinates of the point P which is three-fourth of the way from A(3, 1) to B(–2, 5).

53. The line joining the points A(4, –5) and B(4, 5) is divided by the point P such that AP : AB = 2 : 5, find the coordinates of P.

54. The point P(–4, 1) divides the line segment joining the points A(2, –2) and B in the raio 3 : 5. Find the point B.

55. If A and B are (4, –5) and (4, 5), respectively, find the coordinates of P such that AP = $\frac{2}{5}$ AB and P lies on the line segment AB.

56. Find the coordinates of the points of trisection of the line segment AB, whose end points are A(2, 1) and B(5, –8).

57. Find the coordinates of the points which divide the join A(–4, 0) and B(0, 6) in three equal parts.

58. The line joining the points A(2, 1) and B(5, –8) is trisected at the points P and Q. If the point P lies on the line 2x – y + k = 0, find the value of k.

59. Find the coordinates of the points which divide the line segment joining A(– 2, 2) and B(2, 8) into four equal parts.

60. If A(5, –1), B(–3, –2) and C(–1, 8) are the vertices of ΔABC, find the length of the median through A and the coordinates of the centroid.

61. Find the centroid of ΔABC whose vertices are vertices are A(–3, 0), B(5, –2) and C(–8, 5).

62. Two vertices of a ΔABC are given by A(6, 4) and B(–2, 2) and its centroid is G(3, 4). Find the coordinates of the third vertex C of ΔABC.

63. Find the coordinates of the centroid of a ΔABC whose vertices are A(6, –2), B(4, –3) and C(–1, –4).

64. Find the centroid of a ΔABC whose vertices are A(–1, 0), B(5, –2) and C(8, 2).

65. A(3, 2) and B(–2, 1) are two vertices of a ΔABC, whose centroid is G($\frac{5}{3}, \frac{-1}{3}$). Find the coordinates of the third vertex C.

66. If G(–2, 1) is the centroid of ΔABC and two of its vertices are A(1, –6) and B(–5, 2), find the third vertex of the triangle.

67. Find the third vertex of a ΔABC if two of its vertices are B(–3, 1) and C(0, –2) and its centroid is at the origin.

68. The line segment joining A(–1, $\frac{5}{3}$) and B(a, 5) is divided in the ratio 1 : 3 at P, the point where the line segment AB intersects y-axis. Find the value of a and the coordinates of P.

69. Find the ratio in which the point P whose ordinate is –3 divides the join of A(–2, 3) and B(5, $\frac{-15}{2}$). Hence find the coordinate of P.

70. Calculate the ratio in which the line joining the points A(6, 5) and B(4, –3) is divided by the line y = 2. Also, find the coordinates of the point of intersection.

71. Show that the points (3, –2), (5, 2) and (8, 8) are collinear by using section formula.

72. If the points (–1, –1), (2, p) and (8, 11) are collinear, find the value of p using section formula.

73. If the points (2, 3), (4, k) and (6, –3) are collinear, find the value of k using section formula.

74. If two vertices of a parallelogram are (3, 2), (–1, 0) and its diagonals meet at (2, –5), find the other two vertices of the parallelogram.

75. Find the coordinates of the vertices of a triangle whose midpoints are (–3, 2), (1, –2) and (5, 6).

76. Find the third vertex of a triangle if its two vertices are (–1, 4) and (5, 2) and midpoint of one side is (0, 3).

77. If the midpoints of the sides of a triangle are (2, 3), $(\frac{3}{2}, 4)$ and $(\frac{11}{2}, 5)$, find the centroid of the triangle.

78. If the points (10, 5), (8, 4) and (6, 6) are the midpoints of the sides of a triangle, find its vertices.

79. If the point C(–1, 2) divides the line segment AB in the ratio 3 : 4, where the coordinates of A are (2, 5), find the coordinates of B.

80. The vertices of a quadrilateral are (1, 4), (–2, 1), (0, –1) and (3, 2). Show that diagonals bisect each other. What does quadrilateral become?

81. Using analytical geometry, prove that the midpoint of the hypotenuse of a right triangle is equidistant from its vertices.

82. Using analytical geometry, prove that the diagonals of a rhombus are perpendicular to each other.

83. Prove analytically that the line segment joining the midpoint of two sides of a triangle is half of the third side.

84. If (–2, 3), (4, –3) and (4, 5) are the midpoints of the sides of a triangle, find the coordinates of its centroid.

85. If (1, 1), (2, –3) and (3, 4) are the midpoints of the sides of a triangle, find the coordinates of its centroid.

PRACTICE QUESTIONS
CLASS X : CHAPTER – 7
COORDINATE GEOMETRY
AREA OF TRIANGLE

1. Find the area of a triangle formed by the points A(5, 2), B(4, 7) and C(7, – 4).

2. Find the area of a triangle formed by the points A(1, –1), B(– 4, 6) and C(– 3, – 5).

3. Find the area of a triangle formed by the points A(2, 3), B(– 1, 0) and C(2, –4).

4. Find the area of a triangle formed by the points A(10, –6), B(2, 5) and C(– 1, 3).

5. Determine if the points (1, 5), (2, 3) and (– 2, – 11) are collinear.

6. Show that the points $(\frac{-3}{2}, 3)$, (6, –2), (–3, 4) are collinear by using area of triangle.

7. By using area of triangle show that the points (a, b + c), (b, c + a) and (c, a + b) are collinear.

8. Find the value of *k* if the points A(8, 1), B(k, –4) and C(2, –5) are collinear.

9. Find the value of *k* if the points A(7, –2), B(5, 1) and C(3, k) are collinear.

10. If A(3, 2), B(–1, 0) and C(1, –12) are the vertices of a triangle and D is midpoint of BC, find the coordinates of the point D. Also find the areas of ΔABD and ΔACD. Hence verify that the median AD divides the triangle ABC into two triangles of equal areas.

11. Find the value of *k* if the points A(2, 3), B(4, *k*) and C(6, –3) are collinear.

12. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

13. If A(2, 1), B(6, 0), C(5, –2) and D(–3, –1) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

14. If A(–4, 5), B(0, 7), C(5, –5) and D(–4, –2) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

15. If A(0, 0), B(6, 0), C(4, 3) and D(0, 3) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

16. If A(–4, –2), B(–3, –5), C(3, –2) and D(2, 3) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

17. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, –1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

18. Find a relation between *x* and *y* if the points (*x*, *y*), (1, 2) and (7, 0) are collinear.

19. If A(2, 1), B(–2, 3) and C(4, –3) are the vertices of a ΔABC and D, E are the midpoints of the sides AB, AC respectively, find the coordinates of D and E. Prove that the area of ΔABC is four times the area of ΔADE.

20. If A(4, 4), B(3, –16) and C(3, –2) are the vertices of a ΔABC and D, E, F are the midpoints of the sides BC, CA and AB respectively. Prove that the area of ΔABC is four times the area of ΔDEF.

21. Find the point P on the x – axis which is equidistant from the points A(5, 4) and B(–2, 3). Also find the area of ΔPAB.

22. If P(x, y) is any point on the line joining the points A(a, 0) and B(0, b), then show that $\frac{x}{a}+\frac{y}{b}=1$.

23. If the vertices of a triangle are (1, k), (4, –3) and (–9, 7) and its area is 15 sq. units, find the value(s) of k.

24. Find the value of m for which the points with coordinates (3, 5), (m, 6) and $\left(\frac{1}{2},\frac{15}{2}\right)$ are collinear.

25. Find the value of k for which the points with coordinates (2, 5), (4, 6) and $\left(k,\frac{11}{2}\right)$ are collinear.

26. Find the point P on x-axis which is equidistant from A(–2, 5) and B(2, –3). Also find the area of ΔPAB.

27. Find the point P on x-axis which is equidistant from A(7, 6) and B(–3, 4). Also find the area of ΔPAB.

28. Find the point P on the *x*-axis which is equidistant from A(2, –5) and B(–2, 9). Also find the area of ΔPAB.

29. Find a point P on the *y*-axis which is equidistant from the points A(6, 5) and B(– 4, 3). Also find the area of ΔPAB.

30. Find a point P on the *y*-axis which is equidistant from the points A(5, 2) and B(– 4, 3). Also find the area of ΔPAB.

31. Find a point P on the *y*-axis which is equidistant from the points A(5, – 2) and B(– 3, 2). Also find the area of ΔPAB.

32. Find the value of k for which the area formed by the triangle with vertices A(k, 2k), (–2, 6) and C(3, 1) is 5 square units.

33. Find the value of k for which the area formed by the triangle with vertices A(1, 2), (–2, 3) and C(–3, k) is 11 square units.

34. Find the value of k for which the area formed by the triangle with vertices A(4, 4), (3, k) and C(3, –2) is 7 square units.

35. For what value of p are the points A(–3, 9), B(2, p) and C(4, –5) are collinear.

36. Prove that the area of triangle whose vertices are (t, t – 2), (t + 2, t + 2) and (t + 3, t) is independent of t.

37. For what value of k are the points (k, 2 – 2k), (–k + 1, 2k) and (–4 – k, 6 – 2k) are collinear.

38. Find the condition that the point (x, y) may lie on the line joining (3, 4) and (–5, –6).

39. If the coordinates of two points A and B are (3, 4) and (5, –2) respectively. Find the coordinates of any point P, if PA = PB and area of ΔPAB = 10 sq. units.

40. The coordinates of A, B, C are (6, 3), (–3, 5) and (4, –2) respectively and P is any point (x, y). Show that the ratio of the areas of triangles PBC and ABC is $\left|\frac{x+y-2}{7}\right|$.

41. If (x, y) be on the line joining the two points (1, –3) and (–4, 2), prove that x + y + 2 = 0.

42. Prove that the points (a, b), (x, y) and (a – x, b – y) are collinear if ay = bx.

43. Four points A(6, 3), B(–3, 5), C(4, –2) and D(x, 3x) are given in such a way that $\frac{\Delta DBC}{\Delta ABC}=\frac{1}{2}$, find the value of x.

44. If three points (a, b), (c, d) and (e, f) are collinear, prove that $\frac{d-f}{ce}+\frac{f-b}{ea}+\frac{b-d}{ac}=0$.

45. The area of triangle is 5 sq. units. Two of its vertices are (2, 1) and (3, –2). The third vertex lies on y = x + 3. Find the third vertex.

MCQ WORKSHEET-I
CLASS X: CHAPTER – 9
SOME APPLICATIONS TO TRIGONOMETRY

1. The angle of elevation of the top of a tower from a point on the ground, which is 20m away from the foot of the tower is 60^0. Find the height of the tower.
(a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) none of these

2. The height of a tower is 10m. What is the length of its shadow when Sun's altitude is 45^0?
(a) 10 m (b) 30 m (c) 20 m (d) none of these

3. The angle of elevation of a ladder leaning against a wall is 60^0 and the foot of the ladder is 9.5 m away from the wall. Find the length of the ladder.
(a) 10 m (b) 19 m (c) 20 m (d) none of these

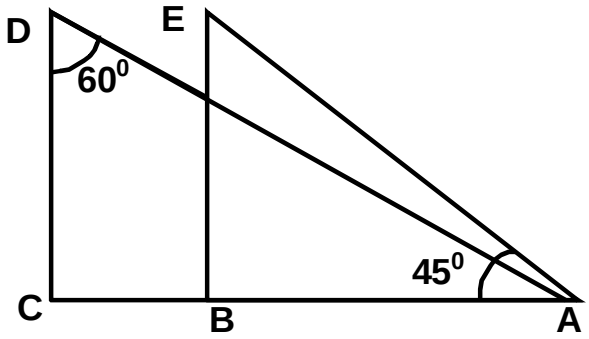
4. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$: 1, what is the angle of elevation of the Sun?
(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

5. What is the angle of elevation of the Sun when the length of the shadow of a vertical pole is equal to its height?
(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

6. From a point on the ground, 20 m away from the foot of a vertical tower, the angle of elevation of the top of the tower is 60^0, what is the height of the tower?
(a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) none of these

7. If the angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary, find the height of the tower.
(a) 10 m (b) 6 m (c) 8 m (d) none of these

8. In the below fig. what are the angles of depression from the observing positions D and E of the object A?
(a) 30^0, 45^0 (b) 60^0 , 45^0 (c) 45^0, 60^0 (d) none of these



9. The ratio of the length of a rod and its shadow is 1: $\sqrt{3}$. The angle of elevation of the sun is
(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

10. If the angle of elevation of a tower from a distance of 100m from its foot is 60^0, then the height of the tower is
(a) $100\sqrt{3}$ m (b) $\frac{200}{\sqrt{3}}$ m (c) $50\sqrt{3}$ m (d) $\frac{100}{\sqrt{3}}$ m

MCQ WORKSHEET-II
CLASS X: CHAPTER – 9
SOME APPLICATIONS TO TRIGONOMETRY

1. If the altitude of the sun is at 60^0, then the height of the vertical tower that will cast a shadow of length 30m is

(a) $30\sqrt{3}$ m (b) 15 m (c) $\frac{30}{\sqrt{3}}$ m (d) $15\sqrt{2}$ m

2. A tower subtends an angle of 30^0 at a point on the same level as its foot. At a second point 'h' metres above the first, the depression of the foot of the tower is 60^0. The height of the tower is

(a) $\frac{h}{2}$ m (b) $\frac{h}{3}$ m (c) $\sqrt{3}h$ m (d) $\frac{h}{\sqrt{3}}$ m

3. A tower is $100\sqrt{3}$ m high. Find the angle of elevation if its top from a point 100 m away from its foot.

(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

4. The angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of the tower is 30^0. Find the height of the tower.

(a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) none of these

5. The string of a kite is 100m long and it makes an angle of 60^0 with the horizontal. Find the height of the kite, assuming that there is no slack in the string.

(a) $100\sqrt{3}$ m (b) $\frac{200}{\sqrt{3}}$ m (c) $50\sqrt{3}$ m (d) $\frac{100}{\sqrt{3}}$ m

6. A kite is flying at a height of 60m above the ground. The inclination of the string with the ground is 60^0. Find the length of the string, assuming that there is no slack in the string.

(a) $40\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) none of these

7. A circus artist is climbing a 20m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole if the angle made by the rope with the ground level is 30^0.

(a) 10 m (b) 30 m (c) 20 m (d) none of these

8. A tower is 50m high, Its shadow ix 'x' metres shorter when the sun's altitude is 45^0 than when it is 30^0. Find the value of 'x'

(a) $100\sqrt{3}$ m (b) $\frac{200}{\sqrt{3}}$ m (c) $50\sqrt{3}$ m (d) none of these

9. Find the angular elevation of the sun when the shadow of a 10m long pole is $10\sqrt{3}$ m.

(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

10. A vertical pole stands on the level ground. From a point on the ground 25m away from the foot of the pole, the angle of elevation of its top is found to be 60^0. Find the height of the pole.

(a) $25\sqrt{3}$ m (b) $\frac{25}{\sqrt{3}}$ m (c) $50\sqrt{3}$ m (d) none of these

MCQ WORKSHEET-III
CLASS X: CHAPTER – 9
SOME APPLICATIONS TO TRIGONOMETRY

1. A kite is flying at a height of 75m above the ground. The inclination of the string with the ground is 60^0. Find the length of the string, assuming that there is no slack in the string.
(a) $40\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $50\sqrt{3}$ m (d) none of these

2. The angle of elevation of the tope of a tree from a point A on the ground is 60^0. On walking 20m away from its base, to a point B, the angle of elevation changes to 30^0. Find the height of the tree.
(a) $10\sqrt{3}$ m (b) $30\sqrt{3}$ m (c) $20\sqrt{3}$ m (d) none of these

3. A 1.5m tall boy stands at a distance of 2m from lamp post and casts a shadow of 4.5m on the ground. Find the height of the lamp post.
(a) 3 m (b) 2.5 m (c) 5 m (d) none of these

4. The height of the tower is 100m. When the angle of elevation of the sun changes from 30^0 to 45^0, the shadow of the tower becomes 'x' meters less. The value of 'x' is
(a) $100\sqrt{3}$ m (b) 100 m (c) $100(\sqrt{3}-1)$ m (d) $\frac{100}{\sqrt{3}}$

5. The tops of two poles of height 20m and 14m are connected by a wire. If the wire makes an angle of 30^0 with horizontal, then the length of the wire is
(a) 12 m (b) 10 m (c) 8 m (d) 6 m

6. If the angles of elevation of a tower from two points distant a and b (a > b) from its foot and in the same straight line from it are 30^0 and 60^0, then the height of the tower is
(a) $\sqrt{a+b}$ m (b) $\sqrt{a-b}$ m (c) $\sqrt{ab}$ m (d) $\sqrt{\frac{a}{b}}$ m

7. The angles of elevation of the top of a tower from two points at a distance of 'a' m and 'b' m from the base of the tower and in the same straight line with it are complementary, then the height of the tower is
(a) $\sqrt{a+b}$ m (b) $\sqrt{a-b}$ m (c) $\sqrt{ab}$ m (d) $\sqrt{\frac{a}{b}}$ m

8. From the top of a cliff 25m high the angle of elevation of a tower is found to be equal to the angle of depression of the foot of the tower. The height of the tower is
(a) 25 m (b) 50 m (c) 75 m (d) 100 m

9. If the angle of elevation of a cloud from a point 200m above a lake is 30^0 and the angle of depression of its reflection in the lake is 60^0, then the height of the cloud above the lake is
(a) 200 m (b) 500 m (c) 30 m (d) 400 m

10. The angle of elevation of a cloud from a point 'h' meter above a lake is 'α'. The angle of depression of its reflection in the lake is 45^0. The height of the cloud is
(a) h.tanα (b) $\frac{h(1+\tan\alpha)}{(1-\tan\alpha)}$ (c) $\frac{h(1-\tan\alpha)}{(1+\tan\alpha)}$ (d) none of these

PRACTICE QUESTIONS
CLASS X: CHAPTER – 9
SOME APPLICATIONS TO TRIGONOMETRY

1. A vertical stick 10 cm long casts a shadow 8 cm long. At the same time, a tower casts a shadow 30 m long. Determine the height of the tower.

2. An observer, 1.5 m tall, is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

3. A person standing on the bank of a river observes that the angle subtended by a tree on the opposite bank is 60^0. When he retreats 20m from the bank, he finds the angle to be 30^0. Find the height of the tree and the breadth of the river.

4. A boy is standing on ground and flying a kite with 150m of string at an elevation of 30^0. Another boy is standing on the roof of a 25m high building and flying a kite at an elevation of 45^0. Find the length of string required by the second boy so that the two kites just meet, if both the boys are on opposite side of the kites.

5. An aeroplane flying horizontally 1000m above the ground, is observed at an angle of elevation 60^0 from a point on the ground. After a flight of 10 seconds, the angle of elevation at the point of observation changes to 30^0. Find the speed of the plane in m/s.

6. An aeroplane when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of the elevation of the two planes from the same point on the ground are 60^0 and 45^0 respectively. Find the vertical distance between the aeroplanes at that instant.

7. An aeroplane at an altitude of 200 m observes the angles of depression of opposite points on the two banks of a river to be 45^0 and 60^0. Find the width of the river.

8. The shadow of a flag staff is three times as long as the shadow of the flag staff when the sun rays meet the ground at an angle of 600. Find the angle between the sun rays and the ground at the time of longer shadow.

9. A vertically straight tree, 15m high is broken by the wind in such a way that it top just touches the ground and makes an angle of 60^0 with the ground, at what height from the ground did the tree break?

10. A man in a boat rowing away from lighthouse 100 m high takes 2 minutes to changes the angle of elevation of the top of lighthouse from 60^0 to 45^0. Find the speed of the boat.

11. As observed from the top of a light house, 100m above sea level, the angle of depression of ship, sailing directly towards it, changes from 30^0 to 45^0. Determine the distance travelled by the ship during the period of observation.

12. A man standing on the deck of ship, which is 10m above the water level, observes the angle of elevation of the top of a hill as 60^0 and the angle of depression of the base of the hill as 30^0. Calculate the distance of the hill from the ship and the height of the hill.

13. The angles of elevation of the top of a tower from two points at a distance of 'a' m and 'b' m from the base of the tower and in the same straight line with it are complementary, then prove that the height of the tower is $\sqrt{a.b}$

14. A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

15. An electrician has to repair an electric fault on a pole of height 5 m. She needs to reach a point 1.3m below the top of the pole to undertake the repair work. What should be the length of the ladder that she should use which, when inclined at an angle of 60° to the horizontal, would enable her to reach the required position? Also, how far from the foot of the pole should she place the foot of the ladder? (You may take $\sqrt{3}$ = 1.73)

16. An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45°. What is the height of the chimney?

17. From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of the building from the point P. (You may take $\sqrt{3}$ = 1.73)

18. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60°. Find the height of the tower.

19. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

20. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

21. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

22. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

23. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

24. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.

25. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during the interval.

26. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

27. A man on cliff observes a boat an angle of depression of 30^0 which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depression of the boat is found to be 60^0. Find the time taken by the boat to reach the shore.

28. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

29. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

30. A tree is broken by the storm. The top of the tree touches the ground making an angle 30° and at a distance of 30 m from the root. Find the height of the tree.

31. A tree 12m high, is broken by the storm. The top of the tree touches the ground making an angle 60°. At what height from the bottom the tree is broken by the storm.

32. At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is $\frac{5}{12}$. In walking 192 m towards the tower, the tangent of the angle of elevation is $\frac{3}{4}$. Find the height of the tower.

33. The pilot of an aircraft flying horizontally at a speed of 1200km/hr, observes that the angle of depression of a point on the ground changes from 30^0 to 45^0 in 15 seconds. Find the height at which the aircraft is flying.

34. If the angle of elevation of the cloud from a point h m above a lake is A and the angle of depression of its reflection in the lake is B, prove that the height of the cloud is $\frac{h(\tan B + \tan A)}{(\tan B - \tan A)}$

35. The angle of elevation of cloud from a point 120m above a lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0. Find the height of the cloud.

36. The angle of elevation of cloud from a point 60m above a lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0. Find the height of the cloud.

37. The angle of elevation of a jet plane from a point A on the ground is 60^0. After a flight of 15 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the jet plane.

38. The angle of elevation of a jet plane from a point A on the ground is 60^0. After a flight of 30 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}$ m, find the speed of the jet plane.

39. There are two temples, one on each bank of river, just opposite to each other. One temple is 50m high. From the top of this temple, the angles of depression of the top and foot of the other temple are 30^0 and 60^0 respectively. Find the width of the river and the height of other temple.

40. A ladder rests against a wall at an angle α to the horizontal, its foot is pulled away from the wall through a distant **a**, so that it slides a distance **b** down the wall making an angle β with the horizontal. Show that $\frac{a}{b} = \frac{\cos\alpha - \cos\beta}{\sin\beta - \sin\alpha}$.

41. From a window, h meter above the ground of a house in a street , the angle of elevation and depression of the top and the foot of another house on the opposite side of the street are θ and ϕ respectively. Show that the height of the opposite house is h (1 + tanθcotϕ).

42. From a window, 15 meters high above the ground of a house in a street , the angle of elevation and depression of the top and the foot of another house on the opposite side of the street are 30^0 and 45^0 respectively. Find the height of the opposite house.

43. Two stations due south of a leaning tower which leans towards the north are at distances a and b from its foot. If α and β are the elevations of the top of the tower from these stations, prove that its inclination θ to the horizontal is given by $\cot\theta = \frac{b\cot\alpha - a\cot\beta}{b-a}$.

44. The angle of elevation of a cliff from a fixed point is θ. After going up a distance of 'k'meters towards the top of the cliff at an angle of ϕ, it is found that the angle of elevation is α. Show that the height of the cliff is $\frac{k(\cos\phi - \sin\phi.\cot\alpha)}{\cot\theta - \cot\alpha}$.

45. A round balloon of radius **r** subtends an angle α at the eye of the observer while the angle of elevation of its centre is β. Prove that the height of the centre of the balloon is $r\sin\beta.\text{cosec}\frac{\alpha}{2}$

46. The angle of elevation of the top of a tower from a point on the same level as the foot of the tower is α. On advancing 'p' meters towards the foot of the tower the angle of elevation becomes β. Show that the height 'h' of the tower is given by h = $\left(\frac{p\tan\alpha\tan\beta}{\tan\beta - \tan\alpha}\right)$m. Also determine the height of the tower if p = 150^o m, α = 30^o and β = 60^o.

47. From the top of a light- house the angle of depression of two ships on the opposite sides of it are observed to be α and β. If the height of the light-house be 'h' meter and the line joining the ships passes through the foot of the light house, show that the distance between the ships is $h\left(\frac{\tan\alpha + \tan\beta}{\tan\alpha.\tan\beta}\right)$meters.

48. An electrician has to repair on electric fault on a pole of height 4m. she needs to reach a point 1.3m below the top of the pole to undertake the repair work. What should be the height of the ladder that she should use at angle of 60^o to the horizontal, would enable her reach the required position? Also, how far the foot of the pole should she place the foot of the ladder.(take $\sqrt{3}$ = 1.732)

49. The angle of elevation of a jet fighter from a point A on the ground is 60^o. After a flight of 15 sec, the angle of elevation changes to 30o. If the jet is flying at a speed of 720 km/hr, find the constant height at which the jet is flying.

50. A man on a top of a tower observes a truck at angle of depression α where tanα = $\frac{1}{\sqrt{5}}$ and sees that it is moving towards the base of the tower. Ten minutes later, the angle of depression of truck found to be β where tanβ = $\sqrt{5}$ if the truck is moving at uniform speed determine how much more time it will take to reach the base of the tower.

51. At the foot of a mountain the elevation of its summit is 45^0; after ascending 1000m towards the mountain up a slope of 30^0 inclination, the elevation is found to be 60^0. Find the height of the mountain.

52. If the angle of elevation of cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake be β, prove that the distance of the cloud from the point of observation is $\frac{2h\sec\alpha}{\tan\beta-\tan\alpha}$.

53. A vertical tower stands on a horizontal plane and is surmounted by a vertical flag staff of height 'h'. At a point on the plane, the angles of elevation of the bottom and top of the flag staff are α and β respectively. Prove that the height of the tower is $\frac{h\tan\alpha}{\tan\beta-\tan\alpha}$.

54. A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30^0 to 45^0, how soon after this, will the car reach the tower? Give your answer to the nearest second.

55. Two pillars of equal height and on either side of a road, which is 100m wide. The angles of depression of the top of the pillars are 60^0 and 30^0 at a point on the road between the pillars. Find the position of the point between the pillars and the height of the tower.

56. The angle of elevation of the top of a tower from a point A due north of the tower is α and from B due west of the tower is β. If AB = d, show that the height of the tower is $\frac{d\sin\alpha\sin\beta}{\sqrt{\sin^2\alpha-\sin^2\beta}}$.

57. The angle of elevation of the top of a tower from a point A due south of the tower is α and from B due east of the tower is β. If AB = d, show that the height of the tower is $\frac{d}{\sqrt{\cot^2\alpha+\cot^2\beta}}$.

58. From an aeroplane vertically above a straight horizontal road, the angles of depression of two consecutive milestones on opposite sides of the aeroplane are observed to be α and β. Show that the height in miles of aeroplane above the road is given by $\frac{\tan\alpha\tan\beta}{\tan\alpha+\tan\beta}$.

59. A tree standing on horizontal plane is leaning towards east. At two points situated at distances a and b exactly due west on it, angles of elevation of the top are respectively α and β. Prove that the height of the top from the ground is $\frac{(b-a)\tan\alpha\tan\beta}{\tan\alpha-\tan\beta}$.

60. The length of the shadow of a tower standing on level plane is found to be 2x metres longer when the sun's altitude is 30^0 than when it was 45^0. Prove that the height of tower is $x\left(\sqrt{3}+1\right)m$.

MCQ WORKSHEET-I
CLASS X: CHAPTER – 10
CIRCLES

1. Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre.

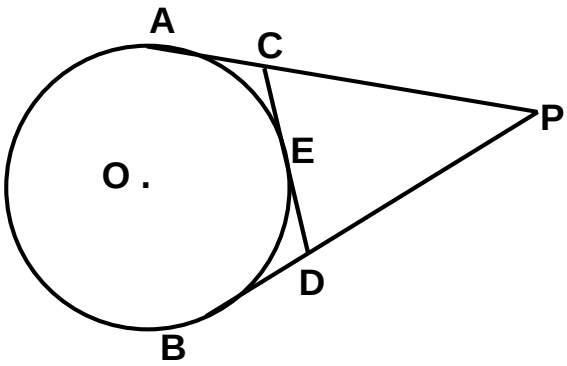
(a) 24 cm (b) 27 cm (c) 26 cm (d) 25 cm

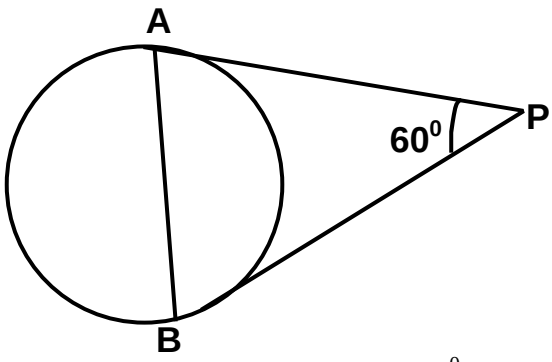
2. A point P is 26 cm away from the centre of a circle and the length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle.

(a) 11 cm (b) 10 cm (c) 16 cm (d) 15 cm

3. From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and PA = 14 cm, find the perimeter of the ΔPCD.

(a) 28 cm (b) 27 cm (c) 26 cm (d) 25 cm



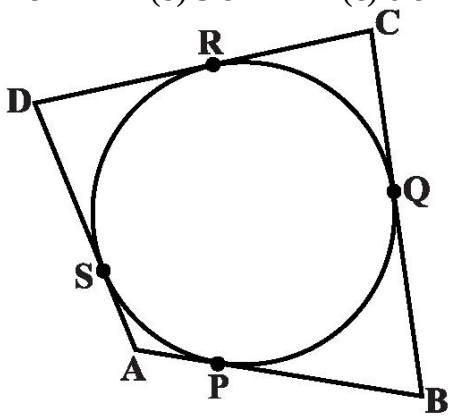


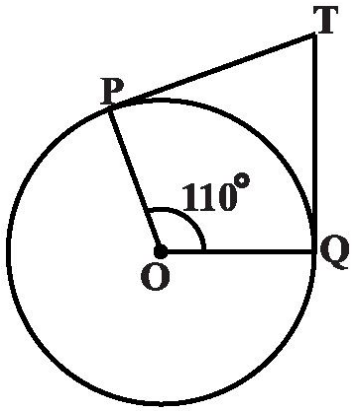
4. In the above sided figure, PA and PB are tangents such that PA = 9cm and ∠APB = 60^0. Find the length of the chord AB.

(a) 4 cm (b) 7 cm (c) 6 cm (d) 9 cm

5. In the below figure the circle touches all the sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm, CD = 4 cm. Find AD.

(a) 4 cm (b) 3 cm (c) 6 cm (d) 9 cm





6. In the above sided Fig., if TP and TQ are the two tangents to a circle with centre O so that ∠POQ = 110°, then ∠PTQ is equal to

(a) 60^0 (b) 70^0 (c) 80^0 (d) 90^0

7. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then ∠POA is equal to

(a) 60^0 (b) 70^0 (c) 80^0 (d) 50^0

8. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

(a) 4 cm (b) 3 cm (c) 6 cm (d) 5 cm

9. From a point P, 10 cm away from the centre of a circle, a tangent PT of length 8 cm is drawn. Find the radius of the circle.

(a) 4 cm (b) 7 cm (c) 6 cm (d) 5 cm

10. PT is tangent to a circle with centre O, OT = 56 cm, TP = 90 cm, find OP

(a) 104 cm (b) 107 cm (c) 106 cm (d) 105 cm

11. TP and TQ are the two tangents to a circle with center O so that angle $\angle POQ = 130^0$. Find $\angle PTQ$.

(a) 50^0 (b) 70^0 (c) 80^0 (d) none of these

12. From a point Q, the length of the tangent to a circle is 40 cm and the distance of Q from the centre is 41 cm. Find the radius of the circle.

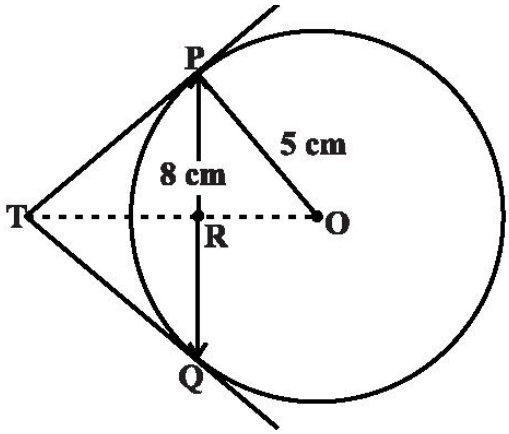
(a) 4 cm (b) 3 cm (c) 6 cm (d) 9 cm

13. The common point of a tangent to a circle with the circle is called _____

(a) centre (b) point of contact (c) end point (d) none of these.

14. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (see below figure). Find the length TP.

(a) $\frac{20}{3}$ cm (b) $\frac{10}{3}$ cm (c) $\frac{40}{3}$ cm (d) none of these



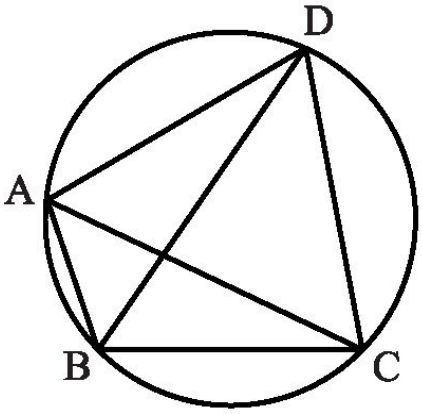
15. *The lengths of tangents drawn from an external point to a circle are equal.*

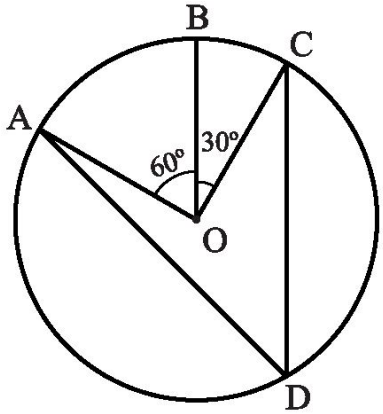
(a) half (b) one third (c) one fourth (d) equal

MCQ WORKSHEET-II
CLASS X: CHAPTER – 10
CIRCLES

1. In below Fig, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If ∠ DBC = 55° and ∠BAC = 45°, find ∠BCD.

(a) 80º (b) 60º (c) 90º (d) none of these





2. In above sided Fig, A,B and C are three points on a circle with centre O such that ∠BOC = 30° and ∠AOB = 60°. If D is a point on the circle other than the arc ABC, find ∠ADC.

(a) 45º (b) 60º (c) 90º (d) none of these

3. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc

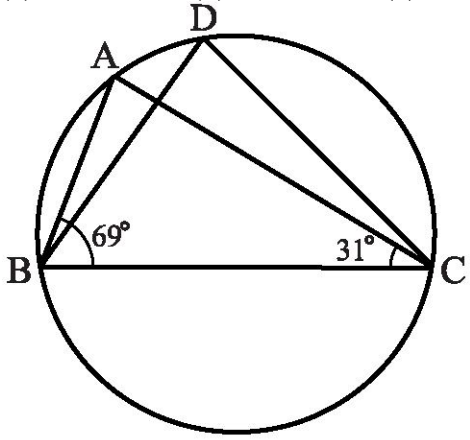
(a) 150^0 (b) 30º (c) 60º (d) none of these

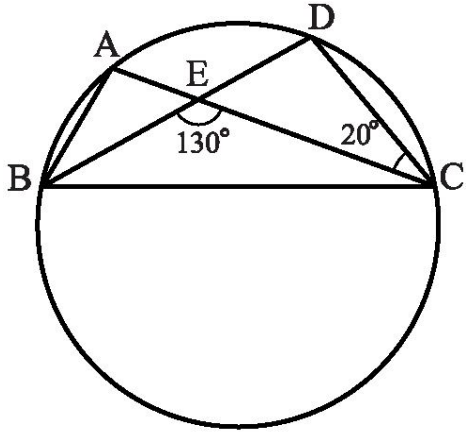
4. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the major arc.

(a) 150^0 (b) 30º (c) 60º (d) none of these

5. In the below Fig., ∠ABC = 69°, ∠ACB = 31°, find ∠BDC.

(a) 80º (b) 60º (c) 90º (d) 100^0





6. In the above sided Fig., A, B, C and D are four points on a circle. AC and BD intersect at a point E such that ∠BEC = 130° and ∠ECD = 20°. Find ∠BAC.

(a) 110º (b) 150º (c) 90º (d) 100^0

7. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If ∠DBC = 70°, ∠BAC is 30°, find ∠BCD.

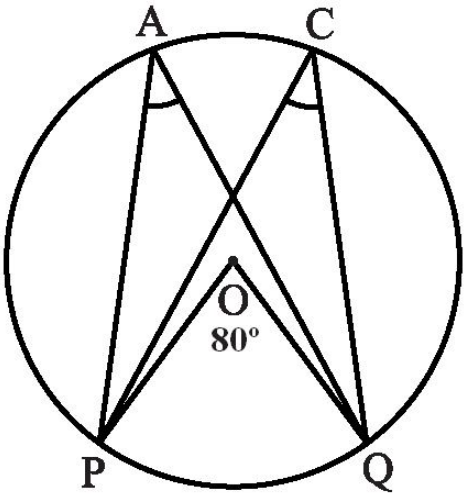
(a) 80º (b) 60º (c) 90º (d) 100^0

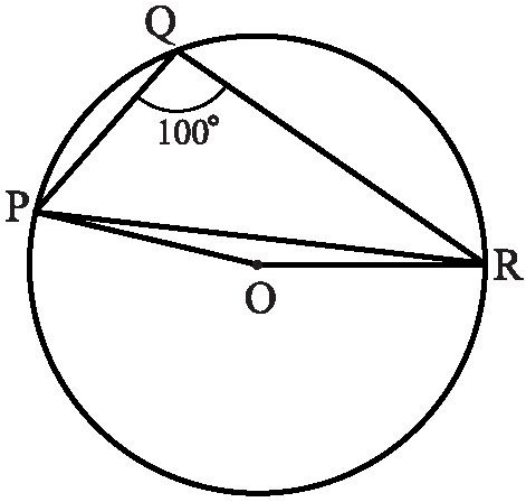
8. ABCD is a cyclic quadrilateral. If ∠BCD = 100°, ∠ABD is 30°, find ∠ABD.
(a) 80º (b) 60º (c) 90º (d) 70^0

9. ABCD is a cyclic quadrilateral. If ∠DBC= 80°, ∠BAC is 40°, find ∠BCD.
(a) 80º (b) 60º (c) 90º (d) 70^0

10. ABCD is a cyclic quadrilateral in which BC is parallel to AD, ∠ADC = 110^0 and ∠BAC = 50^0. Find ∠DAC
(a) 80º (b) 60º (c) 90º (d) 170^0

11. In the below figure, ∠POQ= 80^0, find ∠PAQ
(a) 80º (b) 40º (c) 100º (d) none of these





12. In the above figure, ∠PQR = 100°, where P, Q and R are points on a circle with centre O. Find ∠OPR.
(a) 80º (b) 40º (c) 10º (d) none of these

MCQ WORKSHEET-III
CLASS X: CHAPTER – 10
CIRCLES

1. Distance of chord AB from the centre is 12 cm and length of the chord is 10 cm. Then diameter of the circle is

A. 26 cm B. 13 cm C. $\sqrt{244}$ cm D. 20 cm

2. Two circles are drawn with side AB and AC of a triangle ABC as diameters. Circles intersect at a point D, Then

A. $\angle ADB$ and $\angle ADC$ are equal B. $\angle ADB$ and $\angle ADC$ are compementary

C. Points B, D, C are collinear D. none of these

3. The region between a chord and either of the arcs is called

A. an arc B. a sector C. a segment D. a semicircle

4. A circle divides the plane in which it lies, including circle in

A. 2 parts B. 3 parts C. 4 parts D. 5 parts

5. If diagonals of a cyclic quadrilateral are the diameters of a circle through the vertices of a quadrilateral, then quadrilateral is a

A. parallelogram B. square C. rectangle D. trapezium

6. Given three non collinear points, then the number of circles which can be drawn through these three points are

A. one B. zero C. two D. infinite

7. In a circle with centre O, AB and CD are two diameters perpendicular to each other. The length of chord AC is

A. 2 AB B. $\sqrt{2}$ AB C. $\frac{1}{2}$AB D. $\frac{1}{\sqrt{2}}$AB

8. If AB is a chord of a circle, P and Q are the two points on the circle different from A and B, then

A. $\angle APB = \angle AQB$

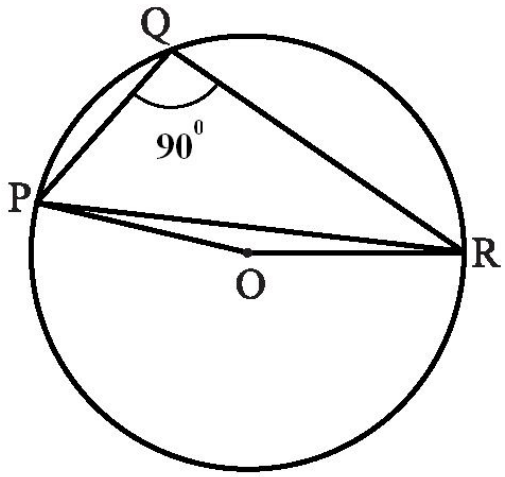
B. $\angle APB + \angle AQB = 180^\circ$

C. $\angle APB + \angle AQB = 90^\circ$

D. $\angle APB + \angle AQB = 180^\circ$

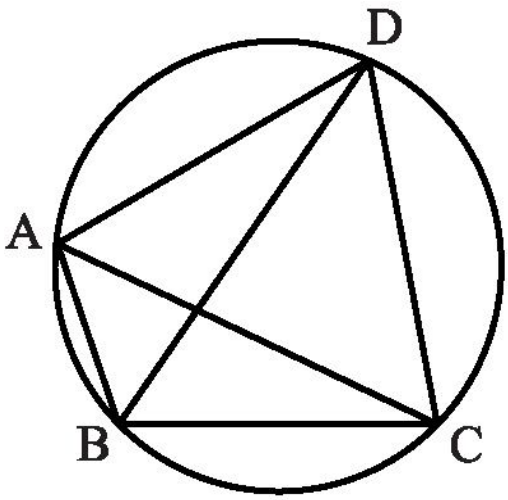
9. In the above figure, ∠PQR = 90°, where P, Q and R are points on a circle with centre O. Find reflex∠POR.

(a) 180º (b) 140º (c) 45º (d) none of these



10. In below Fig, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If ∠ DBC = 60° and ∠BAC = 30°, find ∠BCD.

(a) 80º (b) 60º (c) 90º (d) none of these



PRACTICE QUESTIONS
CLASS X: CHAPTER – 10
CIRCLES

1. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

2. Prove that "The lengths of tangents drawn from an external point to a circle are equal."

3. Prove that "The centre lies on the bisector of the angle between the two tangents drawn from an external point to a circle."

4. Find the length of the tangent drawn to a circle of radius 3 cm, from a point distant 5 cm from the centre.

5. A point P is at a distance 13 cm from the centre C of a circle and PT is a tangent to the given circle. If PT = 12 cm, find the radius of the circle.

6. From appoint Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre of the circle is 25 cm. Find the radius of the circle.

7. The tangent to a circle of radius 6 cm from an external point P, is of length 8 cm. Calculate the distance of P from the nearest point of the circle.

8. Prove that in two concentric circles, the chord of the bigger circle, which touches the smaller circle is bisected at the point of contact.

9. ΔPQR circumscribes a circle of radius r such that angle $Q = 90^0$, PQ = 3 cm and QR = 4 cm. Find r.

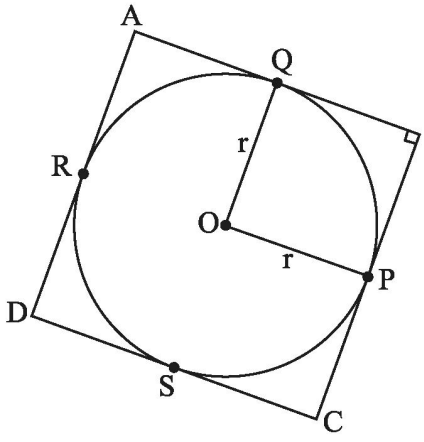
10. Prove that the parallelogram circumscribing a circle is a rhombus.

OR

If all the sides of a parallelogram touch the circle, show that the parallelogram is a rhombus.

11. ABC is an isosceles triangle in which AB = AC, circumscribed about a circle. Show that BC is bisected at the point of contact.

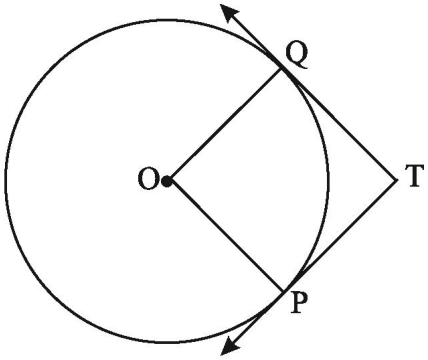
12. In Fig., a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^0$. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius (r) of the circle.



13. ABCD is a quadrilateral such that $\angle D = 90^0$. A circle C(O, r) touches the sides AB, BC, CD and DA at P, Q, R and S respectively. If BC = 38 cm, CD = 25 cm and BP = 27 cm, find r.

14. An isosceles triangle ABC is inscribed in a circle. If AB = AC = 13 cm and BC = 10 cm, find the radius of the circle.

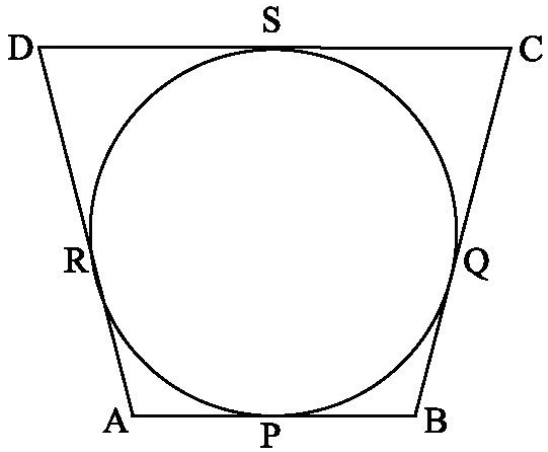
15. Two tangents TP and TQ are drawn from a external point T to a circle with centre O, as shown in fig. If they are inclined to each other at an angle of 100^0 then what is the value of $\angle POQ$?



16. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If AB = AC, prove that BD = CD.

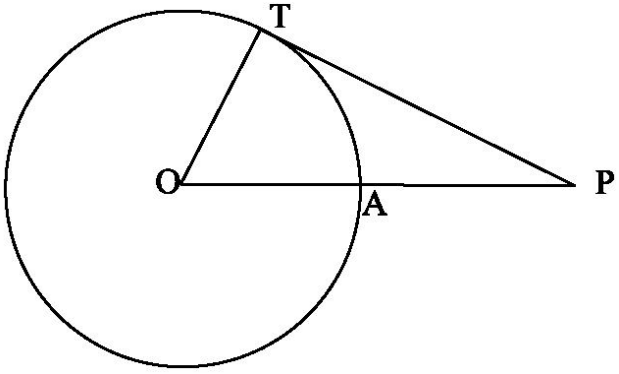
17. XP and XQ are tangents from X to the circle with O and R is a point on the circle. Prove that XA + AR = XB + BR.

18. A circle touches all the four sides of a quadrilateral ABCD with AB = 6 cm, BC = 7cm and CD = 4 cm. Find AD.

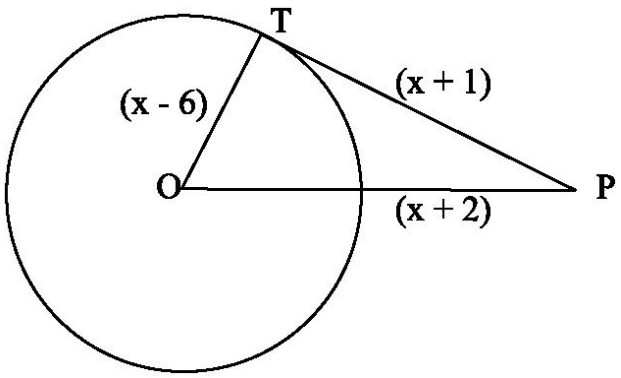


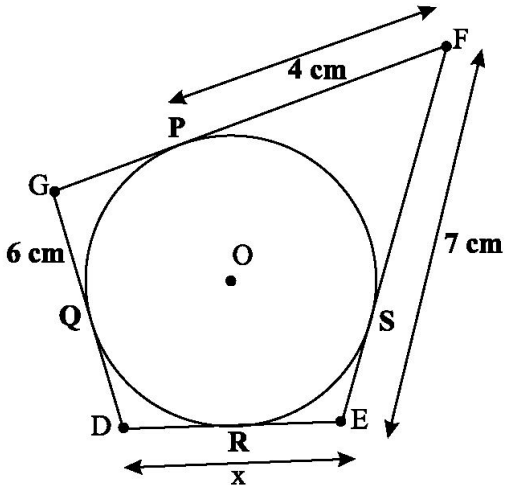
19. TP and TQ are tangents to a circle with centre O at P and Q respectively. PQ = 8cm and radius of circle is 5 cm. Find TP and TQ.

20. In the below figure PT is tangent to a circle with centre O, PT = 36 cm, AP = 24 cm. Find the radius of the circle.



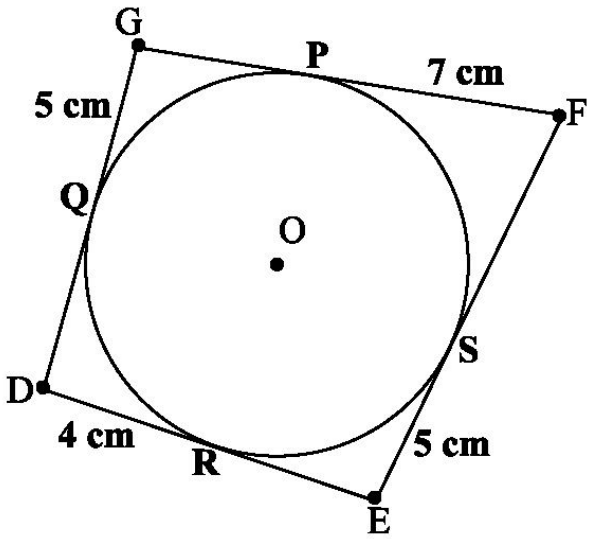
21. In the below figure, find the actual length of sides of ΔOTP.





22. In the above sided figure, find the value of x.

23. Find the perimeter of DEFG.



24. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.

25. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

26. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.

27. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

28. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

29. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC

30. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

31. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

OR

A circle touches all the four sides a quadrilateral ABCD. Prove that the angles subtended at the centre of the circle by the opposite sides are supplementary.

32. PA and PB are the two tangents to a circle with centre O in which OP is equal to the diameter of the circle. Prove that APB is an equilateral triangle.

33. Prove that the intercept of a tangent between two parallel tangents to a circle subtends a right angle at the center of the circle.

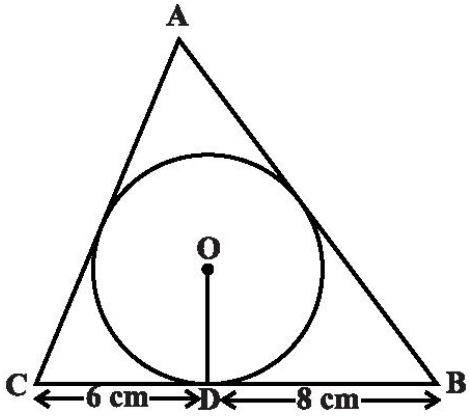
34. If PQ and RS are two parallel tangents to a circle with centre O and another tangent X, with point of contact C intersects PQ at A and RS at B. Prove that $\angle AOB = 90^o$.

35. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If AB = AC, prove that BD = DC.

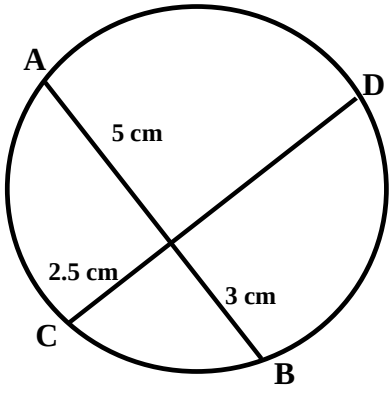
36. Two tangents PA and PB are drawn to the circle with center O, such that $\angle APB = 120^0$. Prove that OP = 2AP.

37. A circle is touching the side BC of ΔABC at P and is touching AB and AC when produced at Q and R respectively. Prove that AQ = ½ (Perimeter of Δ ABC).

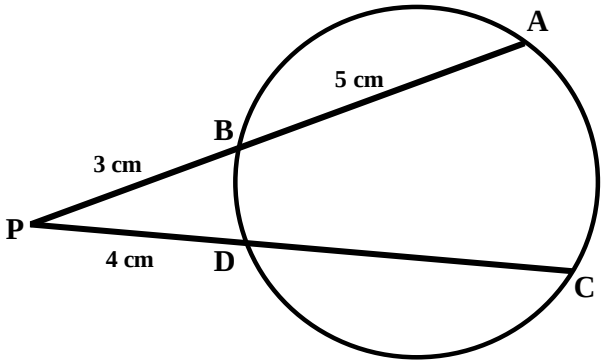
38. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.



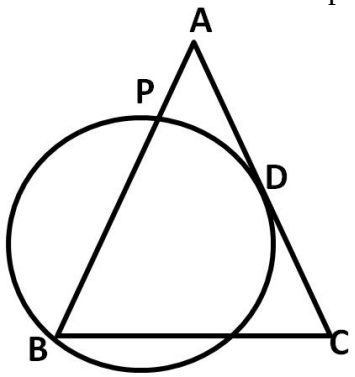
39. In figure, chords AB and CD of the circle intersect at O. OA = 5cm, OB = 3cm and OC = 2.5cm. Find OD.



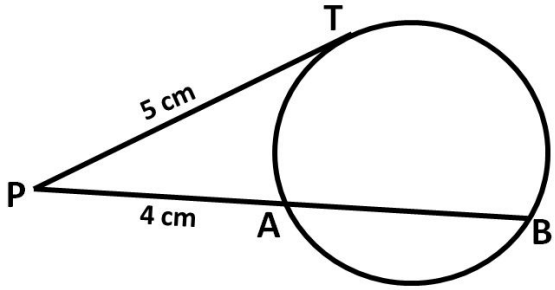
40. In figure. Chords AB and CD intersect at P. If AB = 5cm, PB = 3cm and PD = 4cm. Find the length of CD.



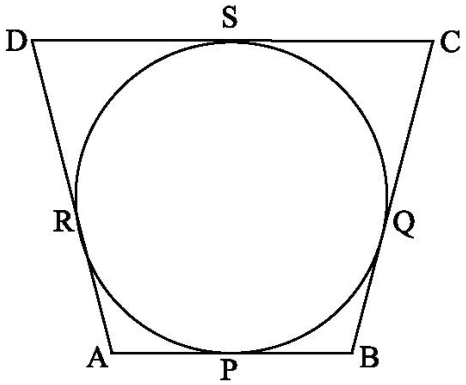
41. In the figure, ABC is an isosceles triangle in which AB = AC. A circle through B touches the side AC at D and intersect the side AB at P. If D is the midpoint of side AC, Then AB = 4AP.



42. In the figure. Find the value of AB Where PT = 5cm and PA = 4cm.



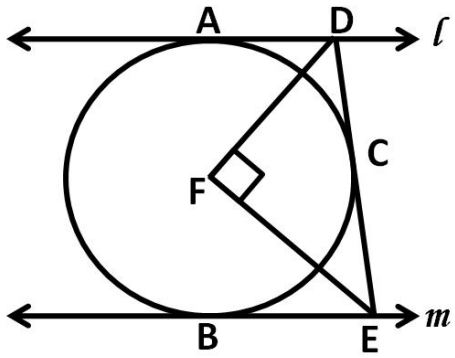
43. In the given figure, a circle touches all the four sides of a quadrilateral ABCD whose sides are AB = 6cm, BC = 7cm and CD = 4cm. Find AD.



44. Prove that "If a line touches a circle and from the point of contact a chord is drawn, the angle which this chord makes with the given line are equal respectively to the angles formed in the corresponding alternate segments."

45. Prove that "If a line is drawn through an end point of a chord of a circle so that the angle formed by it with the chord is equal to the angle subtend by chord in the alternate segment, then the line is a tangent to the circle."

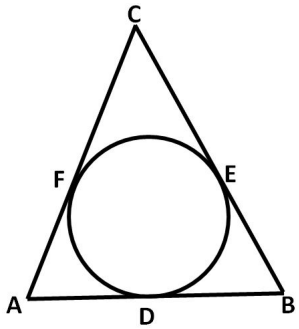
46. In figure. l and m are two parallel tangents at A and B. The tangent at C makes an intercept DE between the tangent l and m. Prove that $\angle DFE = 90^0$



47. In figure, a circle is inscribed in a ΔABC having sides AB = 12 cm, BC = 8cm and AC = 10cm. Find AD, BE and CF.

OR

A circle is inscribed in a ΔABC having sides 8 cm, 10 cm and 12 cm as shown in fig. Find AD, BE and CF.



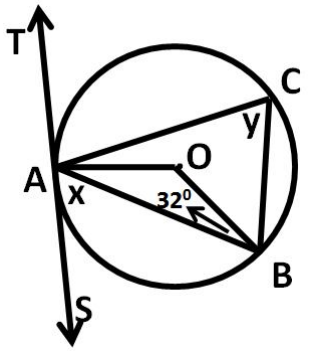
48. If PA and PB are two tangents drawn from a point P to a circle with centre O touching it at A and B, prove that OP is the perpendicular bisector of AB.

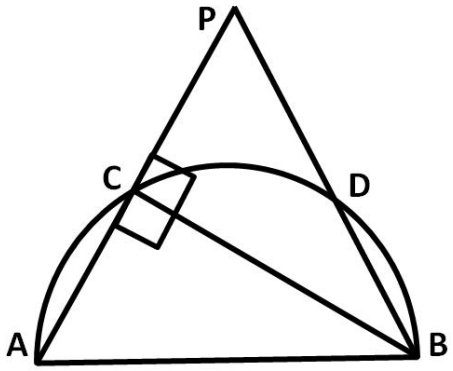
49. If ΔABC is isosceles with AB = AC, Prove that the tangent at A to the circumcircle of ΔABC is parallel to BC.

50. Two circles intersect at A and B. From a point P on one of these circles, two lines segments PAC and PBD are drawn intersecting the other circles at C and D respectively. Prove that CD is parallel to the tangent at P.

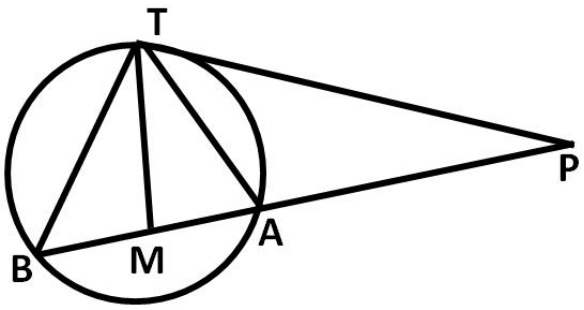
51. Two circles intersect in points P and Q. A secant passing through P intersects the circles at A an B respectively. Tangents to the circles at A and B intersect at T. Prove that A, Q, T and B are concyclic.

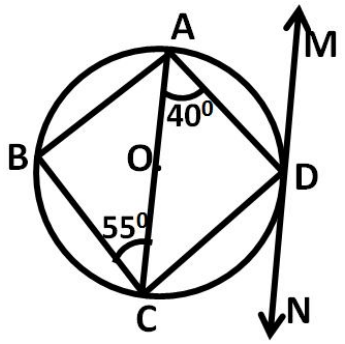
52. In the given figure TAS is a tangent to the circle, with centre O, at the point A. If $\angle OBA = 32^0$, find the value of x and y.





53. In the given figure. PT is a tangent and PAB is a secant to a circle. If the bisector of $\angle ATB$ intersect AB in M, Prove that: (i) $\angle PMT = \angle PTM$ (ii) PT = PM





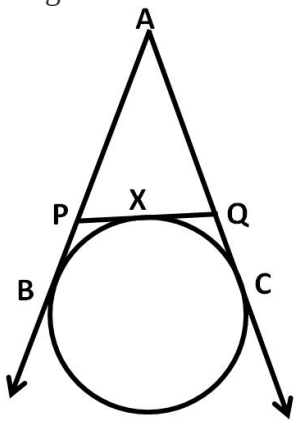
54. In the adjoining figure, ABCD is a cyclic quadrilateral. AC is a diameter of the circle. MN is tangent to the circle at D, $\angle CAD = 40^0, \angle ACB = 55^0$ Determine $\angle ADM$ and $\angle BAD$

55. The diagonals of a parallelogram ABCD intersect at E. Show that the circumcircle of ΔADE and ΔBCE touch each other at E.

56. A circle is drawn with diameter AB interacting the hypotenuse AC of right triangle ABC at the point P. Show that the tangent to the circle at P bisects the side BC.

57. In two concentric circles, prove that all chords of the outer circle which touch the inner circle are of equal length.

58. If AB, AC, PQ are tangents in below figure and AB = 5 cm, find the perimeter of ΔAPQ.



59. If PA and PB are tangents from an outside point P, such that PA = 10 cm and $\angle APB = 60^0$. Find the length of chord AB.

60. From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and PA = 14 cm, find the perimeter of ΔPCD.

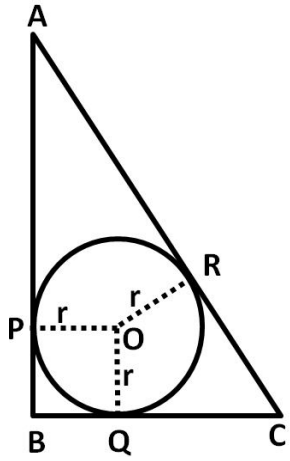
61. Prove that the tangents at the extremities of any chord make equal angles with the chord.

62. From an external point P, two tangents PA and PB are drawn to the circle with centre O. Prove that OP is the perpendicular bisector of AB.

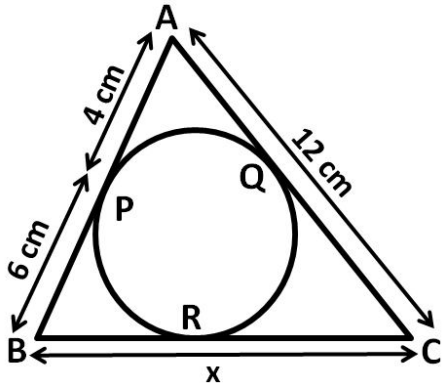
63. The radius of the incircle of a triangle is 4 cm and the segments into which one side divided by the point of contact are 6 cm and 8 cm. Find the other two sides of the triangle.

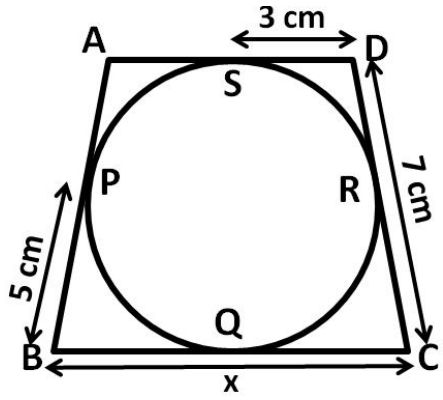
64. From a point P, two tangents PA and PB are drawn to a circle with centre O. If OP = diameter of the circle, show that ΔAPB is an equilateral triangle.

65. In fig. ABC is a right triangle right angled at B such that BC = 6 cm and AB = 8 cm. Find the radius of its incircle.



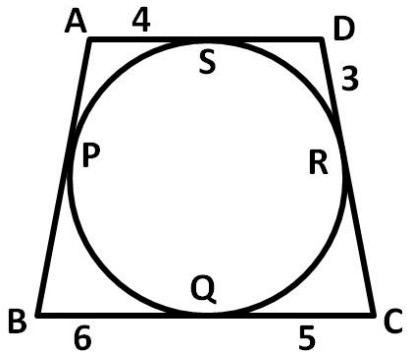
66. In the below figure, ΔABC is circumscribed, find the value of x.

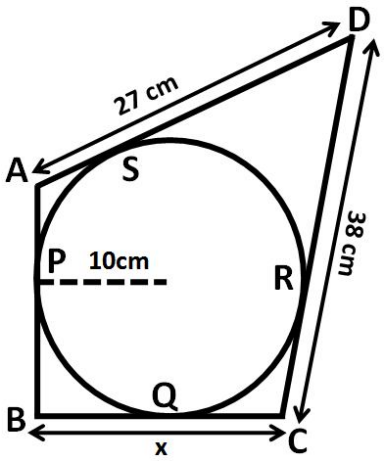




67. In the above right-sided figure, quadrilateral ABCD is circumscribed, find the value of x.

68. In the below figure, quadrilateral ABCD is circumscribed, find the perimeter of quadrilateral ABCD.



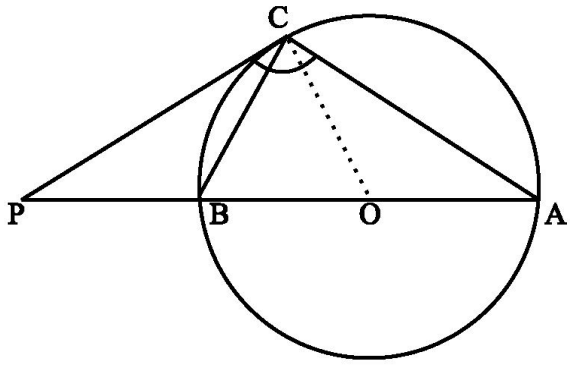


69. In the above right sided figure, quadrilateral ABCD is circumscribed and AD ⊥ DC, find the value of x if the radius of incircle is 10 cm.

70. If an isosceles triangle ABC, in which AB = AC = 6 cm, is inscribed in a circle of radius 9 cm, find the area of the triangle.

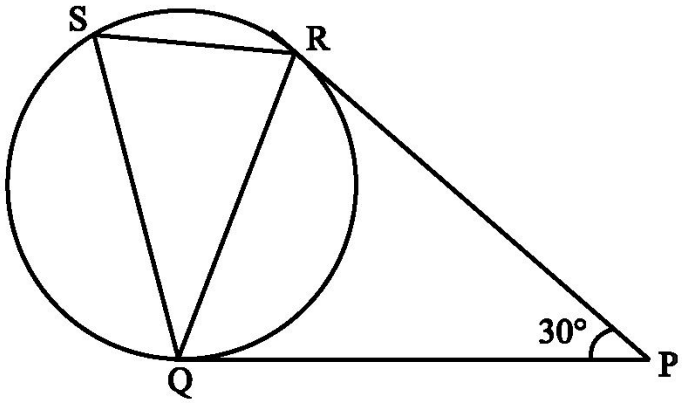
71. A is a point at a distance 13 cm from the centre O of a circle of radius 5 cm. AP and AQ are the tangents to the circle at P and Q. If a tangent BC is drawn at a point R lying on the minor arc PQ to intersect AP at B and AQ at C, find the perimeter of the ΔABC.

72. The tangent at a point C of a circle and a diameter AB when extended intersect at P. If $\angle PCA = 110^0$, find $\angle CBA$

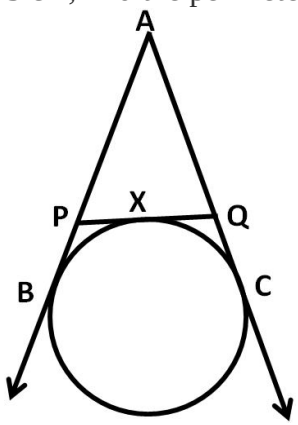


73. In a right triangle ABC in which $\angle B = 90°$, a circle is drawn with AB as diameter intersecting the hypotenuse AC and P. Prove that the tangent to the circle at P bisects BC.

74. AB is a diameter and AC is a chord of a circle with centre O such that $\angle BAC = 30°$. The tangent at C intersects extended AB at a point D. Prove that BC = BD.



75. In the below figure from an external point A, tangents AB and AC are drawn to a circle. PQ is a tangent to the circle at X. If AC = 15 cm, find the perimeter of the triangle APQ.



MCQ WORKSHEET-I
CLASS X: CHAPTER – 11
CONSTRUCTIONS

1. To divide a line segment AB in the ratio 3 : 7, first a ray AX is drawn so that angle BAX is an acute angle and then at equal distances point are marked on the ray AX such that the minimum number of these point is

(a) 3 (b) 10 (c) 7 (d) 12

2. To divide a line segment AB in the ratio 4 : 5, first a ray AX is drawn first such that angle BAX is an acute angle and then points A1, A2, A3, …. are located at equal distances on the ray AX and the point B is joined to

(a) A4 (b) A5 (c) A10 (d) A9

3. To divide a line segment AB in the ratio 4 : 5, first a ray AX is drawn first such that angle BAX is an acute angle, then draw a ray BY parallel to AX and the points A1, A2, A3, …. And B1, B2, B3, … are located at equal distances on the ray AX and BY respectively, then the points joined are

(a) A5 and B6 (b) A6 and B5 (c) A4 and B5 (d) A5 and B4

4. To construct a triangle similar to a given ΔABC with its sides $\frac{2}{5}$ of the corresponding sides of ΔABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. Then, locate point A1, A2, A3,…. On BX at equal distance and next steps is to join

(a) A7 to C (b) A2 to C (c) A5 to C (d) A4 to C

5. To construct a triangle similar to a given ΔABC with its sides $\frac{2}{5}$ of the corresponding sides of ΔABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. The minimum number of points to be located at equal distances on ray BX is

(a) 3 (b) 5 (c) 8 (d) 2

6. To construct a triangle similar to a given ΔABC with its sides $\frac{4}{3}$ of the corresponding sides of ΔABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. The minimum number of points to be located at equal distances on ray BX is

(a) 3 (b) 4 (c) 7 (d) none of these

7. To draw a pair of tangents to a circle which are inclined to each other at an angle of 30^0, it is required to draw tangents at end points of those two radii of the circle, the angle between them, should be

(a) 150^0 (b) 90^0 (c) 60^0 (d) 120^0

8. To draw a pair of tangents to a circle which are inclined to each other at an angle of 60^0, it is required to draw tangents at end points of those two radii of the circle, the angle between them, should be

(a) 150^0 (b) 90^0 (c) 60^0 (d) 120^0

9. In a pair of set, squares, one if with angles are

(a) $30^0, 60^0, 90^0$ (b) $30^0, 30^0, 45^0$ (c) $75^0, 25^0, 80^0$ (d) $65^0, 15^0, 100^0$

10. In a pair of set, squares, the other is with angles
(a) $45^0, 45^0, 90^0$ (b) $30^0, 50^0, 100^0$ (c) $60^0, 60^0, 60^0$ (d) none of these

11. To draw the perpendicular bisector of line segment AB, we open the compass
(a) more than $\frac{1}{2}$AB (b) less than $\frac{1}{2}$AB (c) equal to $\frac{1}{2}$AB (d) none of these

12. To construct an angle of $22\frac{1}{2}^0$, we
(a) bisect an angle of 60^0 (b) bisect an angle of 30^0
(c) bisect an angle of 45^0 (d) none of these

13. To construct a triangle we must know at least its _____ parts.
(a) two (b) three (c) one (d) five

14. For which of the following condition the construction of a triangle is not possible:
(a) If two sides and angle included between them is not given
(b) If two sides and angle included between them is not given
(c) If its three sides are given
(d) If two angles and side included between them is given

15. Construction of a triangle is not possible if:
(a) AB + BC < AC (b) AB + BC = AC (c) both (a) and (b) (d) AB + BC > AC

16. With the help of ruler and compass it is not possible to construct an angle of
(a) 37.5^0 (b) 40.5^0 (c) 22.5^0 (d) 67.5^0

17. The construction of a triangle ABC given that BC = 3 cm, $\angle C = 60^0$ is possible when difference of AB and AC is equal to
(a) 3.2 cm (b) 3.1 cm (c) 3 cm (d) 2.8 cm

18. The construction of a triangle ABC, given that BC = 6cm, $\angle = 45^0$ is not possible when the difference of AB and AC is equal to
(a) 6.9 cm (b) 5.2 cm (c) 5.0 cm (d) 4.0 cm.

19. Construction of a triangle is not possible if:
(a) AB – BC < AC (b) AB – BC = AC (c) both (a) and (b) (d) AB – BC > AC

20. To construct an angle of 15^0, we
(a) bisect an angle of 60^0 (b) bisect an angle of 30^0
(c) bisect an angle of 45^0 (d) none of these

PRACTICE QUESTIONS
CLASS X: CHAPTER – 11
CONSTRUCTIONS

1. Draw two tangents to a circle of radius 3.5 cm from a point P at a distance of 5.5 cm from its centre.

2. Construct a similar ΔABC such that each of its side is $\frac{2}{3}$ of the corresponding sides of ΔABC. It is given that AB = 5 cm, AC = 6cm and BC = 7cm.

3. Draw a line segment AB of length 4.4cm. Taking A as centre, draw a circle of radius 2cm and taking B as centre, draw another circle of radius 2.2cm. Construct tangents to each circle from the centre of the other circle.

4. Draw a pair of tangents to a circle of radius 2 cm that are inclined to each other at an angle of 90^0.

5. Draw a pair of tangents to a circle of radius 3 cm that are inclined to each other at an angle of 50^0.

6. Construct a tangent to a circle of radius 2 cm from a point on the concentric circle of radius 2.6cm and measure its length. Also, verify the measurements by actual calculations.

7. Construct an isosceles triangle whose base is 7 cm and altitude 4 cm and then construct another similar triangle whose sides are $\frac{3}{2}$ time the corresponding sides of the isosceles triangle.

8. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.

9. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

10. Draw a triangle ABC with side BC = 7 cm, ∠B = 45°, ∠A = 105°. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC.

11. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

12. Draw a circle with the help of a bangle. Take a point outside the circle. Construct the pair of tangents from this point to the circle.

13. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

14. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.

15. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.

16. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

17. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

18. Draw a circle of radius 5cm. Take a point P on it. Without using the centre of the circle, construct a tangent at the point P. Write the steps of construction also.

19. Draw a circle of diameter 12cm. From a point P, 10cm away from its centre, construct a pair of tangent to the circle. Measure the lengths of the tangent segments.

20. Draw a circle of radius 5cm. from a point P, 7cm away from its centre, construct a pair of tangents to the circle. Measure the length of the tangent segments.

21. Draw a circle of radius 7cm. From a point P, 8cm away from its centre, Construct a pair tangents to the circle. Measure the length of the tangent segments.

22. Draw a right angled triangle ABC with AB = 4.5cm, AC = 7.5cm and $\angle B = 90^0$. Construct its incircle. Write the steps of construction.

23. Construct a triangle ABC in which BC = 13cm, CA = 5cm and AB = 12cm. Draw its incircle and measure its radius.

24. Construct a triangle ABC in which AB = 3cm, BC = 4cm and AC = 5cm. Draw the circumcircle of triangle ABC.

25. Construct the circumcircle of an equilateral triangle with side 6cm. Write the steps of construction.

MCQ WORKSHEET-I
CLASS X: CHAPTER – 12
AREAS RELATED TO CIRCLES

1. The area of a circle is 49π cm^2. Its circumference is
(a) 7π cm (b) 14π cm (c) 21π cm (d) 28π cm

2. The perimeter of circular field is 242cm. The area of the field is
(a) 9317 cm^2 (b) 18634 cm^2 (c) 4658.5 cm^2 (d) none of these

3. The area of a circle is 38.5 cm^2. Its circumference is
(a) 62 cm (b) 12.1 cm (c) 11 cm (d) 22 cm

4. The difference between the circumference and radius of a circle is 37 cm. The area of the circle is
(a) 111 cm^2 (b) 184 cm^2 (c) 154 cm^2 (d) 259 cm^2

5. The circumference of two circles are in the ratio 2 : 3. The ratio of their areas is
(a) 2 : 3 (b) 4 : 9 (c) 9 : 4 (d) none of these

6. On increasing the diameter of circle by 40%, its area will be increased by
(a) 40% (b) 80% (c) 96% (d) none of these

7. On decreasing the radius of the circle by 30%, its area is decreased by
(a) 30% (b) 60% (c) 45% (d) none of these

8. The area of the square is the same as the area of the circle. Their perimeter re in the ratio
(a) 1 : 1 (b) π : 2 (c) 2 : π (d) none of these

9. The areas of the two circle are in the ratio 4 : 9. The ratio of their circumference is
(a) 2 : 3 (b) 4 : 9 (c) 9 : 4 (d) 4 : 9

10. In making 1000 revolutions, a wheel covers 88 km. The diameter of the wheel is
(a) 14 m (b) 24 m (c) 28 m (d) 40 m

11. The diameter of a wheel is 40 cm. How many revolutions will it make an covering 176 m?
(a) 140 (b) 150 (c) 160 (d) 166

12. The radius of wheel is 0.25 m. How many revolutions will it make in covering 11 km?
(a) 2800 (b) 4000 (c) 5500 (d) 7000

13. Find the circumference of a circle of diameter 21 cm.
(a) 62 cm (b) 64 cm (c) 66 cm (d) 68 cm

14. Find the area of a circle whose circumference is 52.8 cm.
(a) 221.76 cm^2 (b) 220.76 cm^2 (c) 200.76 cm^2 (d) none of these.

15. A steel wire when bent in the form of a square, encloses an area of 121 sq. cm. The same wire is bent in the form of a circle. Find the area of the circle.
(a) 111 cm^2 (b) 184 cm^2 (c) 154 cm^2 (d) 259 cm^2

MCQ WORKSHEET-II
CLASS X: CHAPTER – 12
AREAS RELATED TO CIRCLES

1. A wire is looped in the form of a circle of radius 28 cm. It is rebent into a square form. Determine the length of the side of the square.
(a) 42 cm (b) 44 cm (c) 46 cm (d) 48 cm

2. A circular part, 42 m in diameter has a path 3.5 m wide running round it on the outside. Find the cost of gravelling the path at Rs. 4 per m^2.
(a) Rs. 2800 (b) Rs. 2020 (c) Rs. 2002 (d) none of these

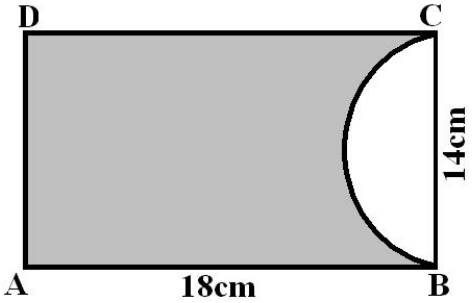
3. A road which is 7m wide surrounds a circular park whose circumference is 352 m. Find the area of the road.
(a) 2618 m^2 (b) 2518 m^2 (c) 1618 m^2 (d) none of these

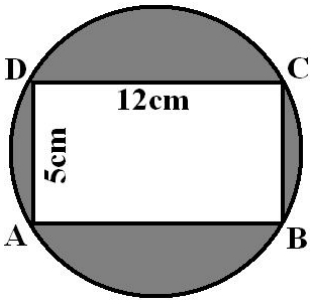
4. If the perimeter of a semicircular protractor is 36 cm, find the diameter.
(a) 14 cm (b) 16 cm (c) 18 cm (d) 12 cm

5. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.
(a) 60 cm (b) 70 cm (c) 66 cm (d) 68 cm

6. The diameter of the wheels of a bus is 140 cm. How many revolutions per minute must a wheel make in order to move a t a speed of 66km/hr?
(a) 240 (b) 250 (c) 260 (d) 270

7. A paper is in the form of a rectangle ABCD in which AB = 18cm and BC = 14cm. A semicircular portion with BC as diameter is cut off. Find the area of the remaining paper (see in below figure).
(a) 175 cm^2 (b) 165 cm^2 (c) 145 cm^2 (d) none of these





8. Find the area of the shaded region in the above sided figure. Take $\pi = 3.14$
(a) 75 cm^2 (b) 72 cm^2 (c) 70 cm^2 (d) none of these

9. A square ABCD is inscribed in a circle of radius 'r'. Find the area of the square in sq. units.
(a) $3r^2$ (b) $2r^2$ (c) $4r^2$ (d) none of these

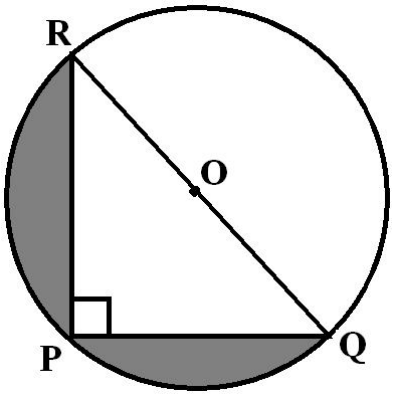
10. Find the area of a right-angled triangle, if the radius of its circumcircle is 2.5 cm and the altitude drawn to the hypotenuse is 2 cm long.
(a) 5 cm^2 (b) 6 cm^2 (c) 7 cm^2 (d) none of these

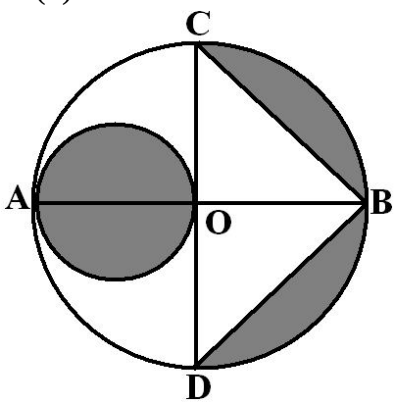
MCQ WORKSHEET-III
CLASS X: CHAPTER – 12
AREAS RELATED TO CIRCLES

1. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.
(a) 44 cm^2 (b) 44.6 cm^2 (c) 44.8 cm^2 (d) none of these

2. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.
(a) 265 cm^2 (b) 266 cm^2 (c) 264 cm^2 (d) none of these

3. Find the area of the shaded region in the given figure, if Pr = 24 cm, PQ = 7 cm and O is the centre of the circle.
(a) 164.54 cm^2 (b) 161.54 cm^2 (c) 162.54 cm^2 (d) none of these





4. In the above-sided figure, AB is a diameter of a circle with centre O and OA = 7 cm. Find the area of the shaded region.
(a) 64.5 cm^2 (b) 61.5 cm^2 (c) 66.5 cm^2 (d) none of these

5. A racetrack is in the form of a ring whose inner circumference is 352 m and outer circumference is 396 m. Find the width of the track.
(a) 4 m (b) 6 m (c) 8 m (d) 7 m

6. The difference between the circumference and the radius of a circle is 37 cm. Find the area of the circle.
(a) 111 cm^2 (b) 184 cm^2 (c) 154 cm^2 (d) 259 cm^2

7. The circumference of a circle exceeds its diameter by 16.8 cm. Find the circumference of the circle.
(a) 24.64 cm (b) 26.64 cm (c) 28.64 cm (d) 22 cm

8. A copper wire when bent in the form of square encloses an area of 484 cm^2. The same wire is now bent in the form of a circle. Find the area of the circle.
(a) 116 cm^2 (b) 166 cm^2 (c) 616 cm^2 (d) none of these

9. Find the area of the sector of a circle of radius 14 cm with central angle 45^0.
(a) 76 cm^2 (b) 77 cm^2 (c) 66 cm^2 (d) none of these

10. A sector is cut from a circle of radius 21 cm. The angle of the sector is 150^0. Find the length of the arc.
(a) 56 cm (b) 57 cm (c) 55 cm (d) 58 cm

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 12
AREAS RELATED TO CIRCLES

1. The area of the sector of a circle of radius r and central angle θ, is

A. ½ l.r B. $2\pi r^2\theta/720$ C. $2\pi r\theta/360$ D. $\pi r\theta/360$

2. An arc of a circle is of length 5π cm and the sector it bounds has an area of 20π cm^2. The radius of circle is

A. 1 cm B. 5 cm C. 8 cm D. 10 cm

3. A sector is cut from a circle of circle of radius 21 cm. The angle of sector is 150^o. The area of sector is

A. 577.5 cm^2 B. 288.2 cm^2 C. 152 cm^2 D. 155 m^2

4. A chord AB of a circle of radius 10 cm makes a right angle at the centre of the circle. The area of major segment is

A. 210 cm^2 B. 235.7 cm^2 C. 185.5 cm^2 D. 258.1 cm^2

5. A horse is tied to a pole with 56 m long string. The area of the field where the horse can graze is

A. 2560 m^2 B. 2464 m^2 C. 9856 m^2 D. 25600 m^2

6. The circumferences of two circles are in the ratio 2:3. The ratio of their areas is

A. 4:9 B. 2:3 C. 7:9 D. 4:10

7. Area enclosed between two concentric circles is 770 cm^2. If the radius of outer circle is 21 cm, then the radius of inner circle is

A. 12 cm B. 13 cm C. 14 cm D. 15 cm

8. The perimeter of a semi-circular protector is 72 cm. Its diameter is

A. 28 cm B. 14 cm C. 36 cm D. 24 cm

9. The minute hand of a clock is 21 cm long. The area described by it on the face of clock in 5 minutes is

A. 115.5 cm^2 B. 112.5 cm^2 C. 211.5 cm^2 D. 123.5 cm^2

10. The area of a circle circumscribing a square of area 64 cm^2 is

A. 50.28 cm^2 B. 25.5 cm^2 C. 100.57 cm^2 D. 75.48 cm^2

11. A pendulum swings through an angle of 30^0 and describes an arc 8.8 cm in length. Find the length of the pendulum.

(a) 16 cm (b) 16.5 cm (c) 16.8 cm (d) 17 cm

12. The minute hand of a clock is 15 cm long. Calculate the area swept by it in 20 minutes. Take $\pi=3.14$

(a) 116 cm^2 (b) 166 cm^2 (c) 616 cm^2 (d) none of these

13. A sector of 56^0, cut out from a circle, contains 17.6 cm^2. Find the radius of the circle.

(a) 6 cm (b) 7 cm (c) 5 cm (d) 8 cm

14. A chord 10 cm long is drawn in a circle whose radius is $5\sqrt{2}$ cm. Find the areas of minor segment. Take $\pi=3.14$

(a) 16 cm^2 (b) 14.5 cm^2 (c) 14.25 cm^2 (d) none of these

15. The circumference of a circle is 88 cm. Find the area of the sector whose central angle is 72^0.

(a) 123 cm^2 (b) 123.5 cm^2 (c) 123.4 cm^2 (d) none of these

PRACTICE QUESTIONS
CLASS X: CHAPTER – 12
AREAS RELATED TO CIRCLES

1. If the perimeter of a semicircular protractor is 36 cm, find its diameter.

2. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

3. The diameter of the wheels of a bus is 140 cm. How many revolutions per minute must a wheel make in order to move at a speed of 66 km per hour?

4. Two circles touch externally. The sum of their areas is 130π sq. cm and the distance between their centres is 14 cm. Find the radii of the circles.

5. Two circles touch internally. The sum of their areas is 116π sq. cm and the distance between their centres is 6 cm. Find the radii of the circles.

6. A paper is in the form of a rectangle ABCD in which AB = 18 cm and BC = 14 cm. A semicircular portion with BC as diameter is cut off. Find the area of the remaining paper.

7. A square ABCD is inscribed in a circle of radius r. Find the area of the square.

8. Find the area of a right-angled triangle, if the radius of its circumcircle is 2.5cm and the altitude drawn to the hypotenuse is 2cm long.

9. A steel wire, bent in the form of a square, encloses an area of 121 sq. cm. The same wire is bent in the form of a circle. Find the area of the circle.

10. A wire is looped in the form of a circle of radius 28 cm. It is rebent into a square form. Determine the length of the side of the square.

11. A circular park, 42 m diameter, has a path 3.5 m wide running round it on the outside. Find the cost of gravelling the path at Rs. 4 per m^2.

12. A road, which is 7m wide, surrounds a circular park whose circumference is 352m. Find the area of the road.

13. A racetrack is in the form of a ring whose inner and outer circumference are 437 m and 503 m respectively. Find the width of the track and also it area.

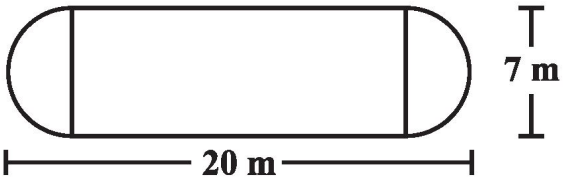
14. From a circular sheet of radius 4 cm, a circle of radius 3 cm is removed. Find the area of the remaining sheet. (Take $\pi = 3.14$)

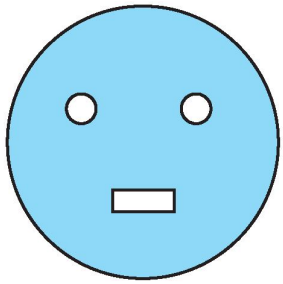
15. Saima wants to put a lace on the edge of a circular table cover of diameter 1.5 m. Find the length of the lace required and also find its cost if one meter of the lace costs Rs 15. (Take $\pi = 3.14$)

16. A circle of radius 2 cm is cut out from a square piece of an aluminium sheet of side 6 cm. What is the area of the left over aluminium sheet? (Take $\pi = 3.14$)

17. The circumference of a circle is 31.4 cm. Find the radius and the area of the circle? (Take $\pi = 3.14$)

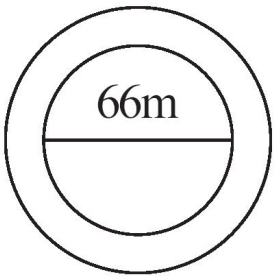
18. The shape of a garden is rectangular in the middle and semi circular at the ends as shown in the diagram. Find the area and the perimeter of this garden

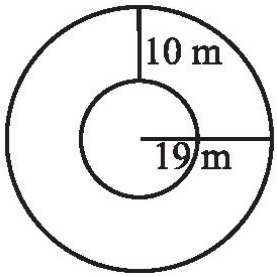




19. From a circular card sheet of radius 14 cm, two circles of radius 3.5 cm and a rectangle of length 3 cm and breadth 1cm are removed. (as shown in the right sided adjoining figure). Find the area of the remaining sheet.

20. A circular flower bed is surrounded by a path 4 m wide. The diameter of the flower bed is 66 m. What is the area of this path? (π= 3.14)





21. Find the circumference of the inner and the outer circles, shown in the right sided adjoining figure? (Take π= 3.14)

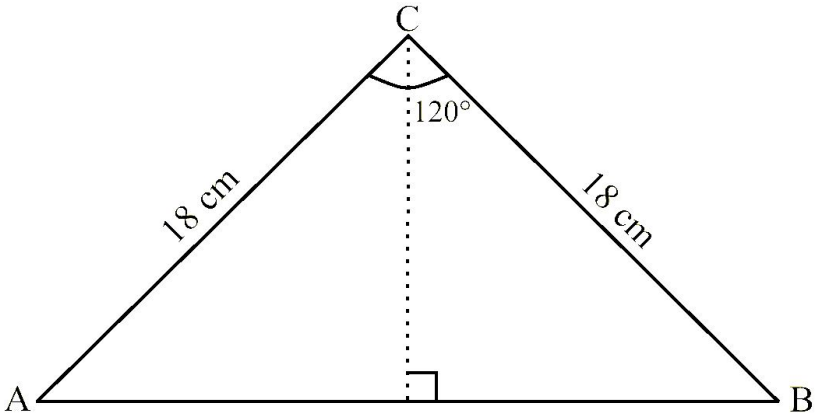
22. Shazli took a wire of length 44 cm and bent it into the shape of a circle. Find the radius of that circle. Also find its area. If the same wire is bent into the shape of a square, what will be the length of each of its sides? Which figure encloses more area, the circle or the square?

23. A circular flower garden has an area of 314 m^2. A sprinkler at the centre of the garden can cover an area that has a radius of 12 m. Will the sprinkler water the entire garden? (Take π = 3.14)

24. How many times a wheel of radius 28 cm must rotate to go 352 m? (Take $\pi = \frac{22}{7}$)

25. Three horses are tethered with 7 m long ropes at the three corners of a triangular field having sides 20m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses. Also, find the area of the plot, which remains ungrazed.

26. Find the area of a ΔOAB with $\angle AOB = 120^0$ & OA = AB = 18 cm.



27. Find the area of sector of angle 120^0 and radius 18 cm.

28. Find the area of the segment AOB of angle 120^0 and radius 18 cm.

29. The minute hand of a circular clock is 15 cm long. Find the area of the face of the clock and how far does the tip of the minute hand move in 35 minutes? (Take π= 3.14)

30. Find the cost of polishing a circular table-top of diameter 1.6 m, if the rate of polishing is Rs 15/m^2. (Take π = 3.14)

31. A chord of a circle of radius 14 cm makes a right angle at the centre. Find the areas of the minor and the major segments of the circle.

32. A square tank has area of 1600 m^2. There are four semicircular plots around it. Find the cost of turfing the plots at Rs. 1.25 per m^2. Take π = 3.14.

33. A lawn is rectangular in the middle and it has semicircular portions along the shorter sides of the rectangle. The rectangular portion measures 50m by 35m. Find the area of the lawn.

34. A rope by which a cow is tethered is increased from 16 m to 23 m. How much additional ground does it have now to graze?

35. The perimeter of a certain sector of a circle of radius 6.5 cm is 31 cm. Find the area of the sector.

36. The area of the sector of a circle of radius 10.5 cm is 69.3 cm^2. Find the central angle of the sector.

37. A sector of 56^0 cut out from a circle, contains 17.6 cm^2. Find the radius of the circle.

38. The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled be their tips in 2 days. Take π = 3.14.

39. Find the lengths of the arcs cut off from a circle of radius 12 cm by a chord 12 cm long. Also find the area of the minor segment. Take $\sqrt{3}$ =1.73 and π = 3.14.

40. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.

41. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the following: (i) Area of minor sector (ii) Area of major sector (iii) Area of major segment (iv) Area of minor segment. (Use π = 3.14)

42. In a circle of radius 10.5 cm, the minor arc is one-fifth of the major arc. Find the area of the sector corresponding to the major arc.

43. It is proposed to add two circular ends, to a square lawn whose side measures 58 cm, the centre of each circle being the point of intersection of the diagonals of the square. Find the area of the whole lawn.

44. It is proposed to add two circular ends, to a square lawn whose side measures 50 m, the centre of each circle being the point of intersection of the diagonals of the square. Find the area of the whole lawn. Take π = 3.14

45. In an equilateral triangle of side 12 cm, a circle is inscribed touching its sides. Find the area of the portion of the triangle not included in the circle. Take $\sqrt{3}$ =1.73 and π = 3.14.

46. In a circle of radius 21 cm, an arc subtends an angle of 60^0 at the centre. Find (i) length of the arc (ii) area of sector formed by the arc (iii) area of segment formed by the corresponding chord of the arc.

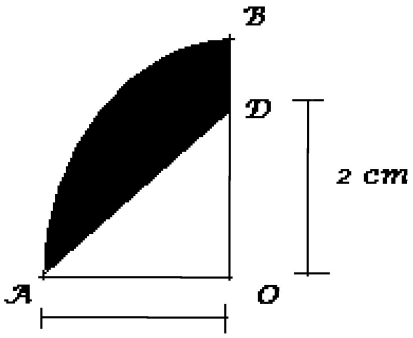
47. If three circles of radius r each, are drawn such that each touches the other two, the find the area included between them. Take $\pi = 3.14$ and $\sqrt{3} = 1.73$.

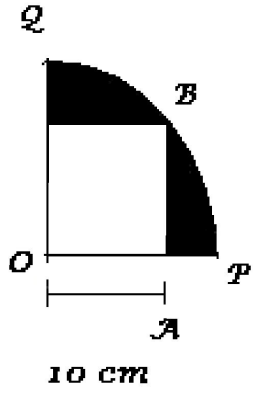
48. If four circles of radius r each, are drawn such that each touches the other two, the find the area included between them. Take $\pi = 3.14$.

49. The length of an arc subtending an angle of 72^0 at the centre is 44 cm. Find the area of the circle.

50. A park is in the form of rectangle 120 m by 100 m. At the centre of the park, there is a circular lawn. The area of the park excluding the lawn is 11384 sq. m. Find the radius of the circular lawn.

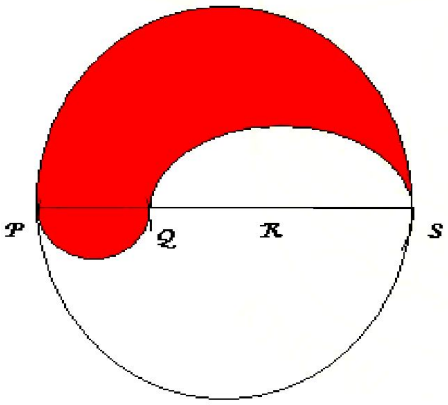
51. Find the area of shaded portion in the below figure

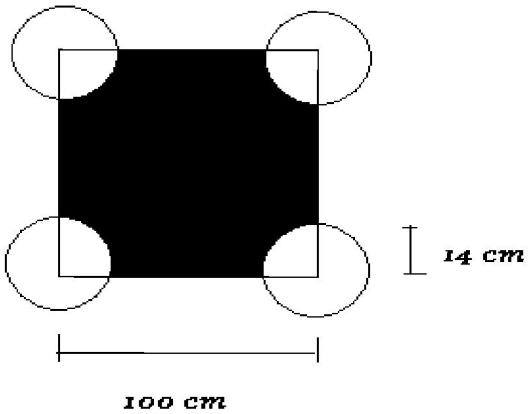




52. Find the area of shaded portion in the above right-sided figure

53. Find the area of shaded portion in the below figure





54. Find the area of shaded portion in the above right-sided figure

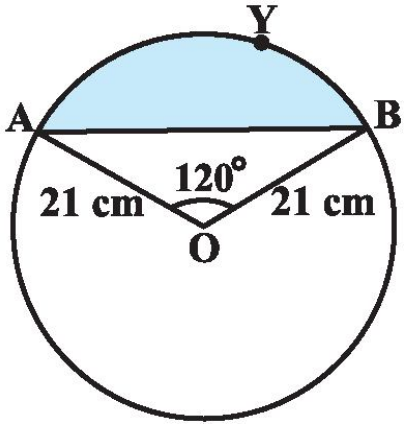
55. An athletic track, 14 m wide, consists of two straight sections 120 m long joining semicircular ends whose inner radius is 35 m. Calculate the area of the track.

56. The cost of fencing a circular field at the rate of Rs 24 per metre is Rs 5280. The field is to be ploughed at the rate of Rs 0.50 per m2. Find the cost of ploughing the field.

57. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

58. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

59. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?



60. Find the area of the segment AYB shown in Fig., if radius of the circle is 21 cm and $\angle AOB = 120°$. (Use $\pi = 22/7$).

61. Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also, find the area of the corresponding major sector (Use $\pi = 3.14$).

62. Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60°.

63. Find the area of a quadrant of a circle whose circumference is 22 cm.

64. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

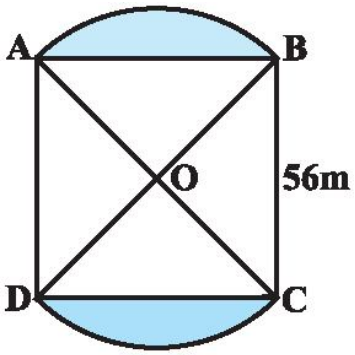
65. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding : (i) minor segment (ii) major sector. (Use $\pi = 3.14$)

66. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find: (i) the length of the arc (ii) area of the sector formed by the arc (iii) area of the segment formed by the corresponding chord

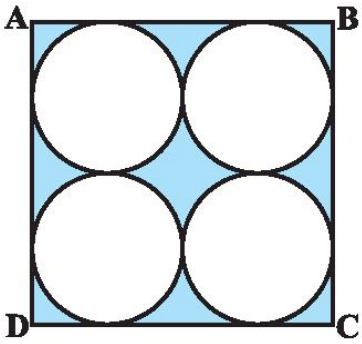
67. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre. Find the areas of the corresponding minor and major segments of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

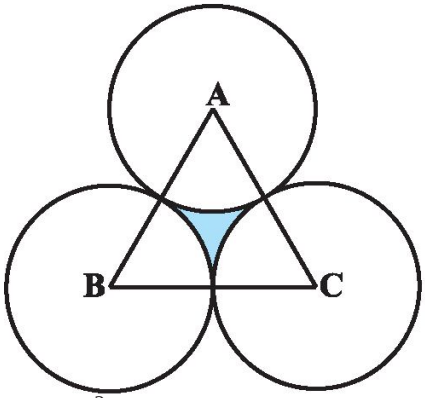
68. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

69. In Fig, two circular flower beds have been shown on two sides of a square lawn ABCD of side 56 m. If the centre of each circular flower bed is the point of intersection O of the diagonals of the square lawn, find the sum of the areas of the lawn and the flower beds.



70. Find the area of the shaded region in the below Fig., where ABCD is a square of side 14 cm.



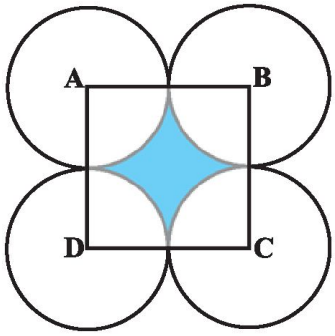


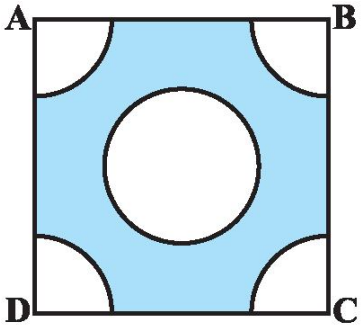
71. The area of an equilateral triangle ABC is 17320.5 cm^2. With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. . (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)

72. An umbrella has 8 ribs which are equally spaced. Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella.

73. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (i) the area of that part of the field in which the horse can graze. (ii) the increase in the grazing area if the rope were 10 m long instead of 5 m. . (Use $\pi = 3.14$)

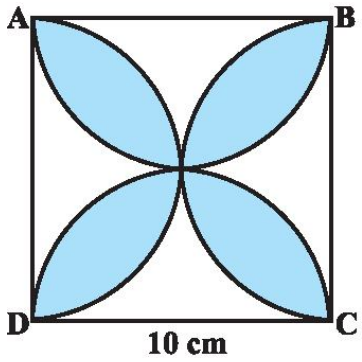
74. In Fig., ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of the remaining three circles. Find the area of the shaded region.

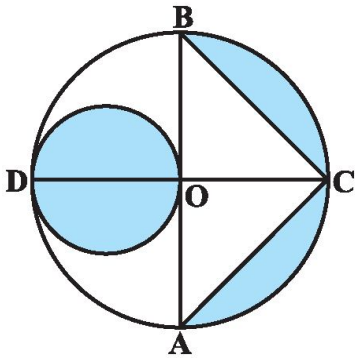




75. From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in above sided Fig. Find the area of the remaining portion of the square.

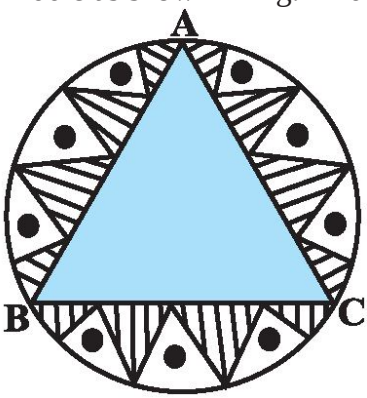
76. Find the area of the shaded design in the below Fig., where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$)

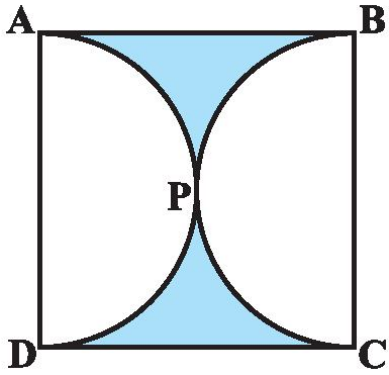




77. In the above sided Fig., AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region.

78. In a circular table cover of radius 32 cm, a design is formed leaving an equilateral triangle ABC in the middle as shown in Fig. Find the area of the design (shaded region).

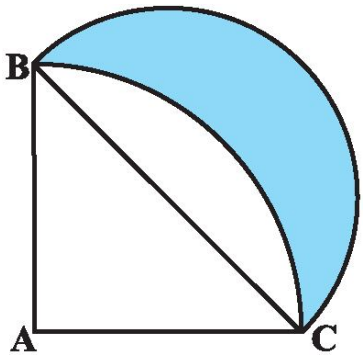


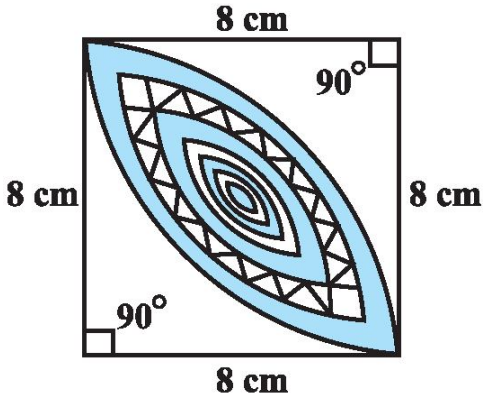


79. Find the area of the shaded region in above sided Fig., if ABCD is a square of side 14 cm and APD and BPC are semicircles.

80. To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. . (Use $\pi = 3.14$)

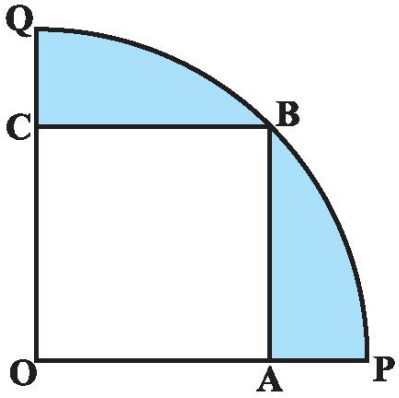
81. In Fig., ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.

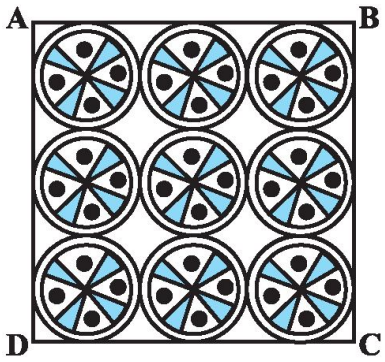




82. Calculate the area of the designed region in the above sided Fig. common between the two quadrants of circles of radius 8 cm each.

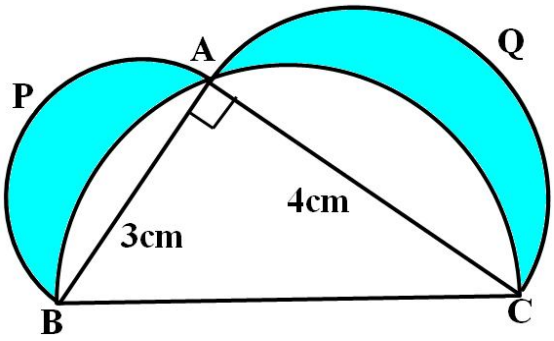
83. In Fig., a square OABC is inscribed in a quadrant OPBQ. If OA = 20 cm, find the area of the shaded region. (Use $\pi = 3.14$)



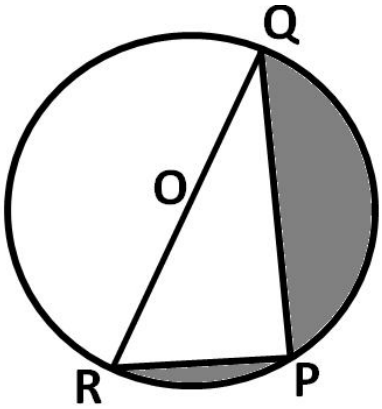


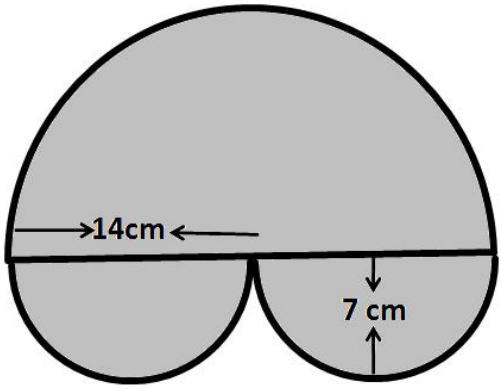
84. On a square handkerchief, nine circular designs each of radius 7 cm are made (see in the above sided Fig.). Find the area of the remaining portion of the handkerchief.

85. In the given figure, ΔABC is right angled at A. Semicircles are drawn on AB, AC and BC as diameters. It is given that AB = 3cm and AC = 4cm. Find the area of the shaded region.



86. Find the area of the shaded region in the below figure, if PQ = 24 cm, PR = 7 cm and O is the centre of the circle.





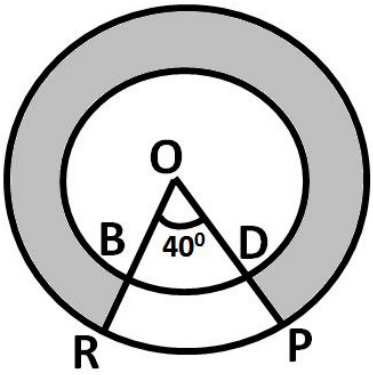
87. Find the areas of the shaded region in the above right sided figure.

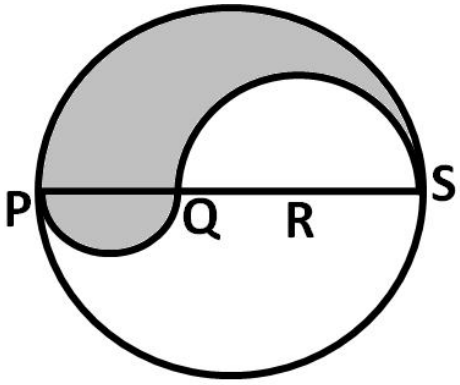
88. In an equilateral triangle of side 24 cm, a circle is inscribed touching its sides. Find the area of the remaining portion of the triangle. Take $\sqrt{3} = 1.732$

89. Find to the three places of decimals the radius of the circle whose area is the sum of the areas of two triangles whose sides are 35, 53, 66 and 33, 56, 65 measured in cms. (Take $\pi = \frac{22}{7}$)

90. A square park has each side of 100m. At each corner of the park, there is a slower bed in the form of a quadrant of radius 14 m. Find the area of the remaining part of the park. (Take $\pi = \frac{22}{7}$)

91. Find the area of the shaded region in below figure, where radii of the two concentric circles with centre O are 7 cm and 14 cm respectively and $\angle AOC = 40^0$.



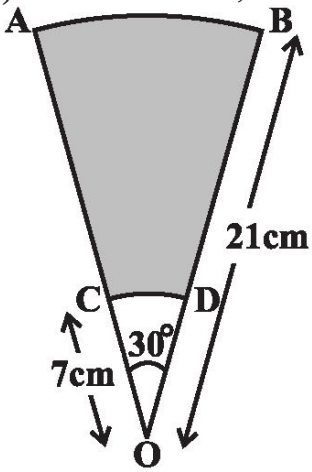


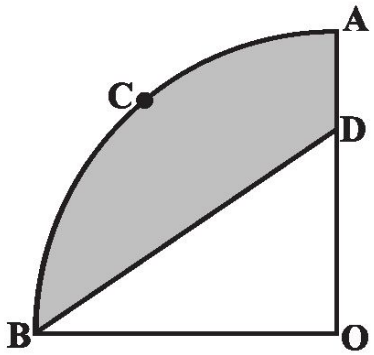
92. PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semicircles are drawn on PQ and QS as diameters as shown in above right sided figure. Find the perimeter and area of the shaded region.

93. An athletic track 14 m wide consists of two straight sections 120 m long joining semicirculars ends whose inner radius is 35m. Calculate the area of the shaded region.

94. The above right-sided figure depicts a racing track whose left and right ends are semicircular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find : (i) the distance around the track along its inner edge (ii) the area of the track.

95. AB and CD are respectively arcs of two concentric circles of radii 21 cm and 7 cm and centre O (see below Figure). If $\angle$ AOB = 30°, find the area of the shaded region.

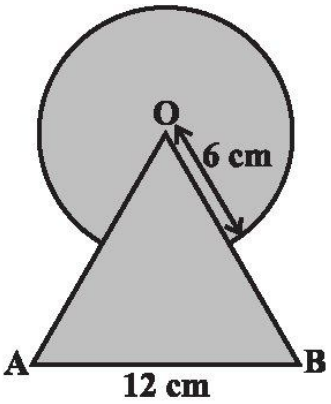


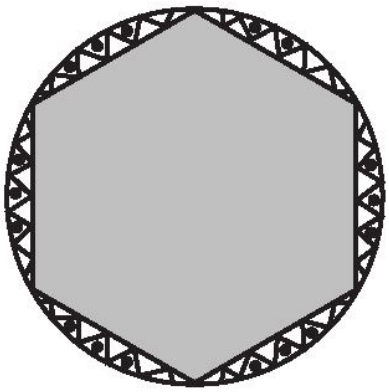


96. In the above right sided Figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the (i) quadrant OACB, (ii) shaded region.

97. A path of 4m width runs round a semicircular grassy plot whose circumference is $163\frac{3}{7}$ m. Find (i) the area of the path (ii) the cost of gravelling the path at the rate of Rs. 1.50 per sq. m (iii) the cost of turfing the plot at the rate of 45 paise per sq. m.

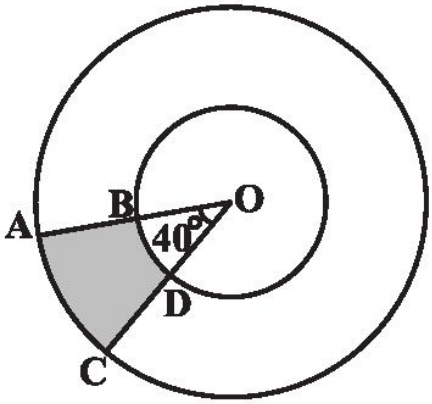
98. Find the area of the shaded region in below figure, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.

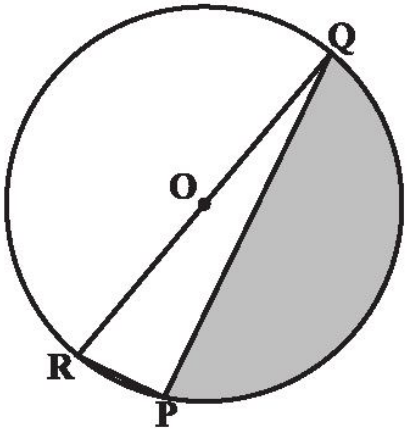




99. A round table cover has six equal designs as shown in the above right-sided figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs 0.35 per cm2. (Use $\sqrt{3}$ =1.7)

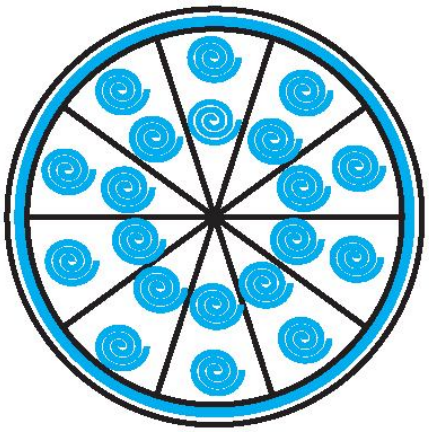
100. Find the area of the shaded region in the below figure, if radii of the two concentric circles with centre O are 7 cm and 14 cm respectively and ∠AOC = 40°.





101. Find the area of the shaded region in the above right-sided figure, if PQ = 24 cm, PR = 7 cm and O is the centre of the circle.

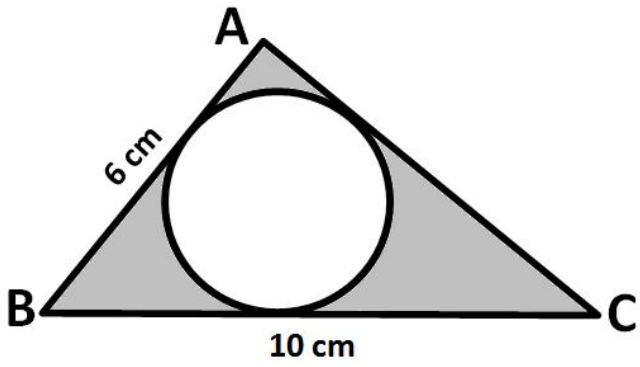
102. A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in below figure. Find : (i) the total length of the silver wire required. (ii) the area of each sector of the brooch.

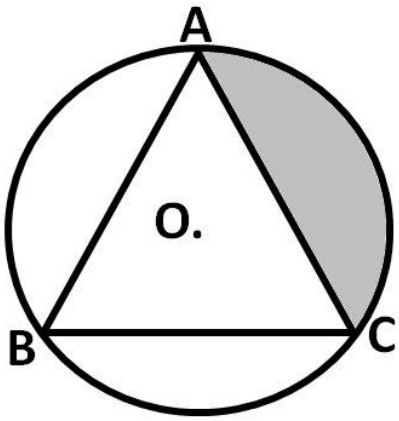


103. The area of a sector is one-twelfth that of the complete circle. Find the angle of the sectort.

104. Find the area of the circle in which a square of area 64 sq. cm is inscribed . (use π = 3.14)

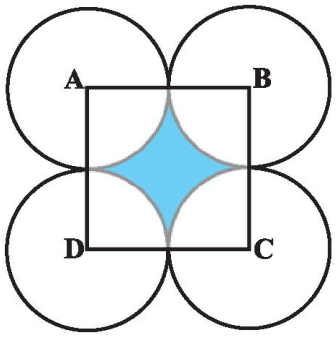
105. In the below figure, ABC is right angled triangle at A. Find the area of the shaded region, if AB = 6cm and BC = 10cm..

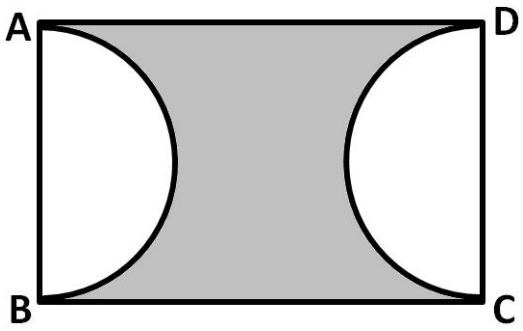




106. In the above right-sided figure, ABC is an equilateral triangle inscribed in a circle of radius 4 cm with centre O. Find the area of the shaded region.

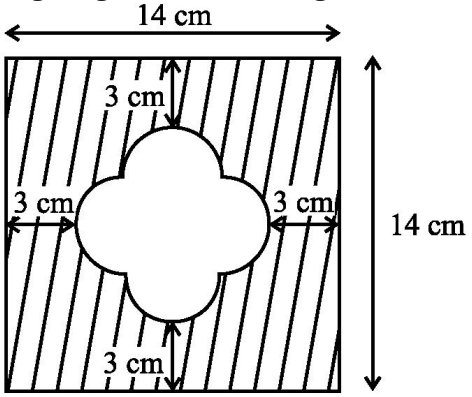
107. The diameter of a coin is 1 cm see the below figure. If four such coins be placed on a table so that the rim of each touches that of the other two, find the area of the shaded region. (use π = 3.1416)





108. In the above right-sided figure, ABCD is a rectangle, having AB = 14 cm and BC = 20 cm. Two sectors of 1800 have been cut off. Calculate (i) area of the shaded region (ii) length of the boundary of the shaded region.

109. Find the area of the shaded region given in below Figue



110. Find the number of revolutions made by a circular wheel of area 1.54 m2 in rolling a distance of 176 m.

111. Find the difference of the areas of two segments of a circle formed by a chord of length 5 cm subtending an angle of 90° at the centre.

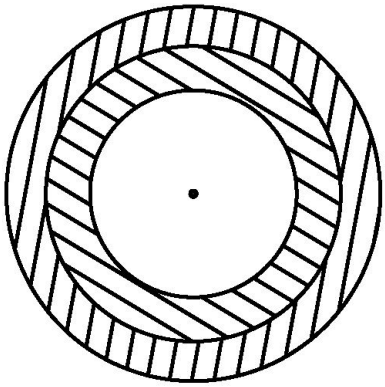
112. Find the difference of the areas of a sector of angle 120° and its corresponding major sector of a circle of radius 21 cm.

113. The central angles of two sectors of circles of radii 7 cm and 21 cm are respectively 120° and 40°. Find the areas of the two sectors as well as the lengths of the corresponding arcs.

114. The length of the minute hand of a clock is 5 cm. Find the area swept by the minute hand during the time period 6:05 a m and 6:40 a m.

115. All the vertices of a rhombus lie on a circle. Find the area of the rhombus, if area of the circle is 1256 cm^2. (Use $\pi = 3.14$).

116. An archery target has three regions formed by three concentric circles as shown in the below figure. If the diameters of the concentric circles are in the ratio 1: 2:3, then find the ratio of the areas of three regions.



117. Area of a sector of central angle 200° of a circle is 770 cm^2. Find the length of the corresponding arc of this sector.

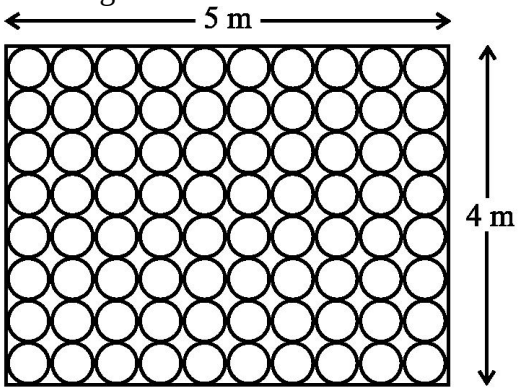
118. Three circles each of radius 3.5 cm are drawn in such a way that each of them touches the other two. Find the area enclosed between these circles.

119. Find the area of the sector of a circle of radius 5 cm, if the corresponding arc length is 3.5 cm.

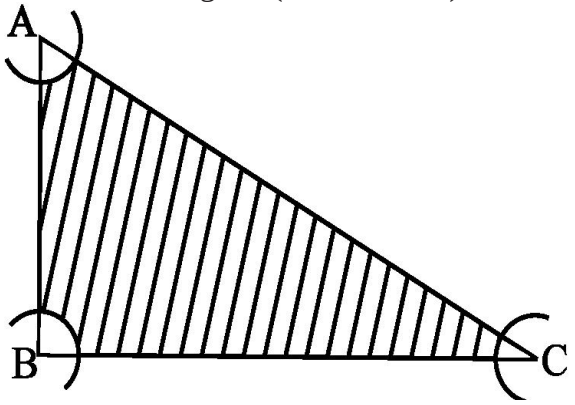
120. Four circular cardboard pieces of radii 7 cm are placed on a paper in such a way that each piece touches other two pieces. Find the area of the portion enclosed between these pieces.

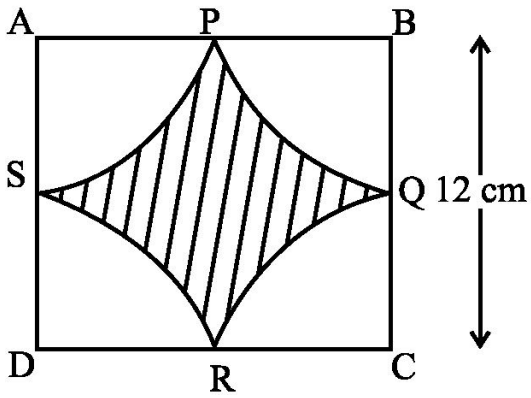
121. On a square cardboard sheet of area 784 cm^2, four congruent circular plates of maximum size are placed such that each circular plate touches the other two plates and each side of the square sheet is tangent to two circular plates. Find the area of the square sheet not covered by the circular plates.

122. Floor of a room is of dimensions 5 m × 4 m and it is covered with circular tiles of diameters 50 cm each as shown in the below figure. Find the area of floor



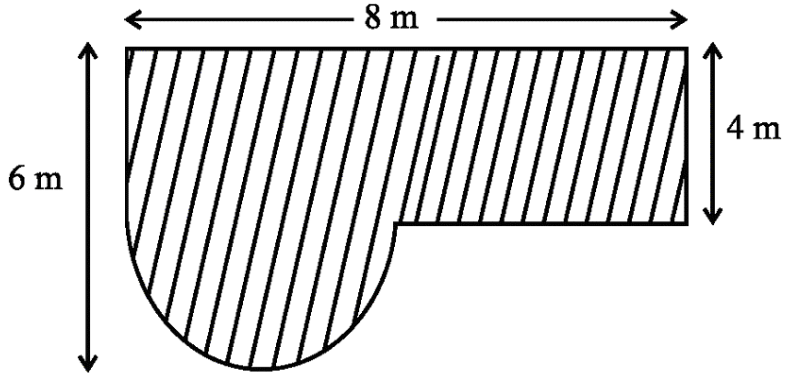
123. With the vertices A, B and C of a triangle ABC as centres, arcs are drawn with radii 5 cm each as shown in below figure. If AB = 14 cm, BC = 48 cm and CA = 50 cm, then find the area of the shaded region. (Use $\pi = 3.14$).



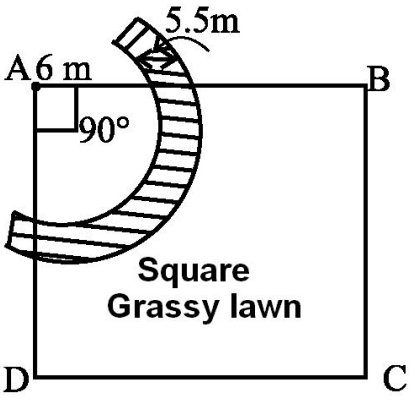


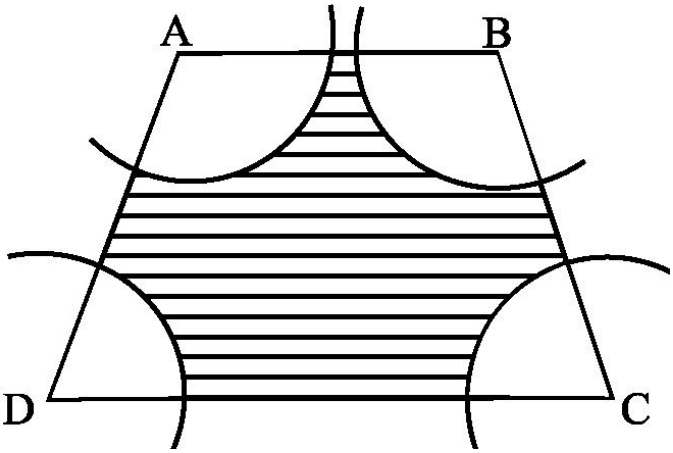
124. Find the area of the shaded region in the above right sided figure, where arcs drawn with centres A, B, C and D intersect in pairs at mid-points P, Q, R and S of the sides AB, BC, CD and DA, respectively of a square ABCD (Use $\pi = 3.14$).

125. Find the area of the shaded field shown in the below figure.



126. A calf is tied with a rope of length 6 m at the corner of a square grassy lawn of side 20 m. If the length of the rope is increased by 5.5m, find the increase in area of the grassy lawn in which the calf can graze.



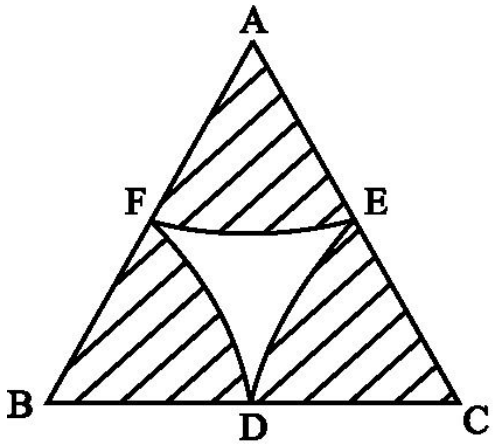


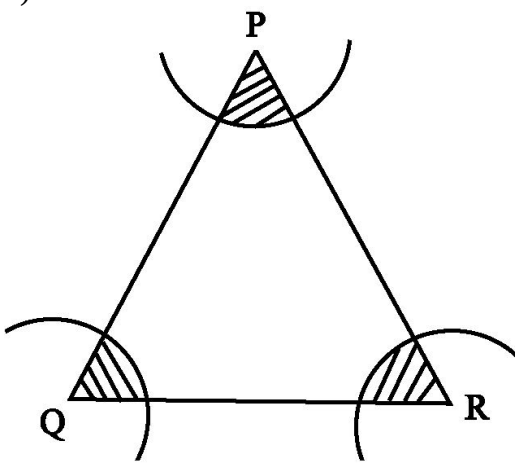
127. In the above right sided figure, ABCD is a trapezium with AB || DC, AB = 18 cm, DC = 32 cm and distance between AB and DC = 14 cm. If arcs of equal radii 7 cm with centres A, B, C and D have been drawn, then find the area of the shaded region of the figure.

128. A circular pond is 17.5 m is of diameter. It is surrounded by a 2 m wide path. Find the cost of constructing the path at the rate of Rs 25 per m^2

129. A circular park is surrounded by a road 21 m wide. If the radius of the park is 105 m, find the area of the road.

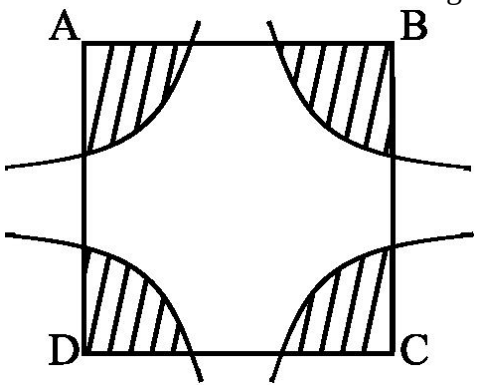
130. In the below figure, arcs are drawn by taking vertices A, B and C of an equilateral triangle of side 10 cm. to intersect the sides BC, CA and AB at their respective mid-points D, E and F. Find the area of the shaded region (Use $\pi = 3.14$).





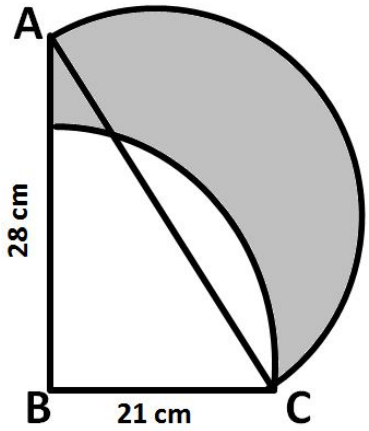
131. In the above right sided figure, arcs have been drawn with radii 14 cm each and with centres P, Q and R. Find the area of the shaded region.

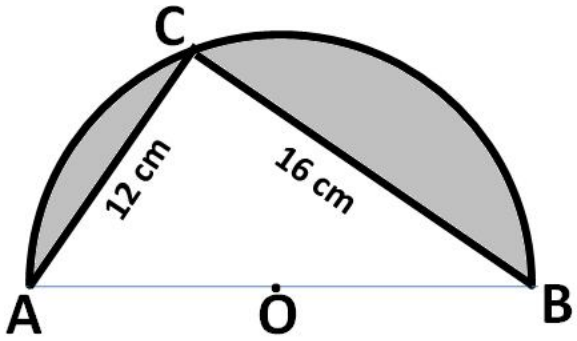
132. In the below figure, arcs have been drawn of radius 21 cm each with vertices A, B, C and D of quadrilateral ABCD as centres. Find the area of the shaded region.



133. A piece of wire 20 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle.

134. In the below figure, ABC is a right angled triangle at B, AB = 28 cm and BC = 21 cm. With diameter a semicircle is drawn and with BC as radius a quarter circle is drawn. Find the area of the shaded region correct to two decimal places.





135. In the above right-sided figure, O is the centre of a circular arc and AOB is a straight line. Find the perimeter and the area of the shaded region. (use $\pi = 3.142$)

MCQ WORKSHEET-I
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The surface area of a cuboid is
(a) $2(lb + bh + lh)$ (b) $3(lb + bh + lh)$ (c) $2(lb – bh – lh)$ (d) $3(lb – bh – lh)$

2. The surface area of a cube if edge 'a' is
(a) $7a^2$ (b) $6a^2$ (c) $5a^3$ (d) $5a^2$

3. The length, breadth and height of a room is 5m, 4m and 3m. The cost of white washing its four walls at the rate of Rs. 7.50 per m^2 is
(a) Rs. 110 (b) Rs. 109 (c) Rs. 220 (d) Rs. 105

4. The perimeter of floor of rectangular hall is 250m. The cost of the white washing its four walls is Rs. 15000. The height of the room is
(a) 5m (b) 4m (c) 6m (d) 8m

5. The breadth of a room is twice its height and is half of its length. The volume of room is $512dm^3$. Its dimensions are
(a) 16 dm, 8 dm, 4 dm (b) 12 dm, 8 dm, 2 dm
(c) 8 dm, 4 dm, 2 dm (d) 10 dm, 15 dm, 20 dm

6. The area of three adjacent faces of a cube is x, y and z. Its volume V is
(a) $V = xyz$ (b) $V^3 = xyz$ (c) $V^2 = xyz$ (d) none of these

7. Two cubes each of edge 12 cm are joined. The surface area of new cuboid is
(a) 140 cm^2 (b) 1440 cm^2 (c) 144 cm^2 (d) 72 cm^2

8. The curved surface area of cylinder of height 'h' and base radius 'r' is
(a) $2\pi rh$ (b) πrh (c) $\frac{1}{2}\pi rh$ (d) none of these

9. The total surface area of cylinder of base radius 'r' and height 'h' is
(a) $2\pi(r + h)$ (b) $2\pi r(r + h)$ (c) $3\pi r(r + h)$ (d) $4\pi r(r + h)$

10. The curved surface area of a cylinder of height 14 cm is 88 cm^2. The diameter of its circular base is
(a) 5cm (b) 4cm (c) 3cm (d) 2cm

11. It is required to make a closed cylindrical tank of height 1 m and base diameter 140cm from a metal sheet. How many square meters a sheet are required for the same?
(a) $6.45m^2$ (b) $6.48m^2$ (c) $7.48m^2$ (d) $5.48m^2$.

12. A metal pipe is 77 cm long. Inner diameter of cross section is 4 cm and outer diameter is 4.4 cm. Its inner curved surface area is:
(a) 864 cm^2 (b) 968 cm^2 (c) 768 cm^2 (d) none of these

MCQ WORKSHEET-II
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. The area of the playground in m^2 is:
(a) 1584 (b) 1284 (c) 1384 (d) 1184

2. A cylindrical pillar is 50 cm in diameter and 3.5 m in height. The cost of painting its curved surface at the rate of Rs. 12.50 per m^2 is:
(a) Rs. 68.75 (b) Rs. 58.75 (c) Rs. 48.75 (d) Rs. 38.75

3. The inner diameter of circular well is 3.5m. It is 10m deep. Its inner curved surface area in m^2 is:
(a) 120 (b) 110 (c) 130 (d) 140

4. In a hot water heating system there is a cylindrical pipe of length 28 m and diameter 5 cm. The total radiating surface area in the system in m^2 is:
(a) 6.6 (b) 5.5 (c) 4.4 (d) 3.4

5. The curved surface area of a right circular cone of slant height 10 cm and base radius 7 cm is
(a) 120 cm^2 (b) 220 cm^2 (c) 240 cm^2 (d) 140 cm^2

6. The height of a cone is 16 cm and base radius is 12 cm. Its slant height is
(a) 10 cm (b) 15 cm (c) 20 cm (d) 8 cm

7. The curved surface area of a right circular cone of height 16 cm and base radius 12 cm is
(a) 753.6 cm^2 (b) 1205.76 cm^2 (c) 863.8 cm^2 (d) 907.6 cm^2

8. The curved surface area of a right circular cone of slant height 10 cm and base radius 10.5 cm is
(a) 185 cm^2 (b) 160 cm^2 (c) 165 cm^2 (d) 195 cm^2

9. The slant height of a cone is 26 cm and base diameter is 20 cm. Its height is
(a) 24 cm (b) 25 cm (c) 23 cm (d) 35 cm

10. The curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. The radius of its base is
(a) 8 cm (b) 7 cm (c) 9 cm (d) 12 cm

11. A conical tent is 10 m high and the radius of its base is 24 m. The slant height of tent is
(a) 26 m (b) 28 m (c) 25 m (d) 27 m

12. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. The cost of white washing its curved surface at the rate of Rs. 210 per 100 m^2 is
(a) Rs. 1233 (b) Rs. 1155 (c) Rs. 1388 (d) Rs. 1432

MCQ WORKSHEET-III
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. A joker's cap is in the form of cone of base radius 7 cm and height 24 cm. The area of sheet to make 10 such caps is
(a) 5500 cm^2 (b) 6500 cm^2 (c) 8500 cm^2 (d) 3500 cm^2

2. A solid right cylinder cone is cut into two parts at the middle of its height by a plane parallel to its base. The ratio of the volume of the smaller cone to the whole cone is
(a) 1 : 2 (b) 1 : 4 (c) 1 : 6 (d) 1 : 8

3. The total surface area of a hemisphere of radius 'r' is
(a) $2\pi r^2$ (b) $4\pi r^2$ (c) $3\pi r^2$ (d) $5\pi r^2$

4. The curved surface area of a sphere of radius 7 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2

5. The curved surface area of a hemisphere of radius 21 cm is:
(a) 2772 cm^2 (b) 2564 cm^2 (c) 3772 cm^2 (d) 4772 cm^2

6. The curved surface area of a sphere of radius 14 cm is:
(a) 2464 cm^2 (b) 2428 cm^2 (c) 2464 cm^2 (d) none of these.

7. The curved surface area of a sphere of diameter 14 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2

8. Total surface area of hemisphere of radius 10 cm is
(a) 942 cm^2 (b) 940 cm^2 (c) 842 cm^2 (d) 840 cm^2

9. The radius of a spherical balloon increases from 7 cm to 14 cm s air is being pumped into it. The ratio of surface area of the balloon in the two cases is:
(a) 4 : 1 (b) 1 : 4 (c) 3 : 1 (d) 1 : 3

10. A matchbox measures 4 cm x 2.5 cm x 1.5 cm. The volume of packet containing 12 such boxes is:
(a) 160 cm^3 (b) 180 cm^3 (c) 160 cm^2 (d) 180 cm^2

11. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litre of water can it hold?
(a) 1350 liters (b) 13500 liters (c) 135000 liters (d) 135 liters

12. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?
(a) 4.75 m (b) 7.85 m (c) 4.75 cm (d) none of these

13. The capacity of a cuboidal tank is 50000 litres. The length and depth are respectively 2.5 m and 10 m. Its breadth is
(a) 4 m (b) 3 m (c) 2 m (d) 5 m

14. A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown.
(a) 18000 (b) 16000 (c) 15000 (d) 14000

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?
(a) 4000 m^3 (b) 40 m^3 (c) 400 m^3 (d) 40000 m^3

2. The circumference of the base of a cylindrical vessel is 132 cm and its height is 25 cm. How many litres of water can it hold?
(a) 33.75 litre (b) 34.65 litre (c) 35.75 litre (d) 38.75 litre

3. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find radius of its base
(a) 5cm (b) 4cm (c) 3cm (d) 6cm

4. It costs Rs 2200 to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of Rs 20 per m^2, find radius of the base,
(a) 1.75 m (b) 1.85 m (c) 1.95 m (d) 1.65 m

5. The height and the slant height of a cone are 21 cm and 28 cm respectively. Find the volume of the cone.
(a) 5546 cm^3 (b) 7546 cm^3 (c) 5564 m^3 (d) 8546 cm^3

6. Find the volume of the right circular cone with radius 6 cm, height 7 cm
(a) 254 cm^3 (b) 264 cm^3 (c) 274 cm^2 (d) 284 cm^3

7. The radius and height of a conical vessel are 7 cm and 25 cm respectively. Its capacity in litres is
(a) 1.232 litre (b) 1.5 litre (c) 1.35 litre (d) 1.6 litre

8. The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base.
(a) 12 cm (b) 10 cm (c) 15 cm (d) 18 cm

9. If the volume of a right circular cone of height 9 cm is 48π cm^3, find the diameter of its base.
(a) 12 cm (b) 10 cm (c) 6 cm (d) 8 cm

10. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilolitres?
(a) 38.5 kl (b) 48.5 kl (c) 39.5 kl (d) 47.5 kl

11. Find the capacity in litres of a conical vessel with radius 7 cm, slant height 25 cm
(a) 1.232 litre (b) 1.5 litre (c) 1.35 litre (d) none of these

12. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?
(a) $\frac{1}{64}$ (b) $\frac{1}{32}$ (c) $\frac{1}{16}$ (d) $\frac{1}{48}$

13. The dimensions of a cuboid are 50 cm x 40 cm x 10 cm. Its volume in litres is:
(a) 10 litres (b) 12 litres (c) 20 litres (d) 25 litres

14. The volume of a cuboidal tank is 250 m^3. If its base area is 50 m^2 then depth of the tank is
(a) 5 m (b) 200 m (c) 300 m (d) 12500 m

MCQ WORKSHEET-V
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The length, breadth and height of a cuboidal solid is 4 cm, 3 cm and 2 cm respectively. Its volume is

(a) (4 + 3 +2) cm^3 (b) 2(4 + 3 +2) cm^3 (c) (4 x 3 x 2) cm^3 (d) 2(4 + 3) x 2 cm^3

2. The volume of a cuboidal solid of length 8 m and breadth 5 m is 200 m^3. Find its height.

(a) 5 m (b) 6 m (c) 15 m (d) 18 m

3. The curved surface area of a sphere is 616 cm^2. Its radius is

(a) 7 cm (b) 5 cm (c) 6 cm (d) 8 cm

4. If radius of a sphere is $\frac{2d}{3}$ then its volume is

(a) $\frac{32}{81}\pi d^3$ (b) $\frac{23}{4}\pi d^3$ (c) $\frac{32}{3}\pi d^3$ (d) $\frac{34}{3}\pi d^3$

5. The capacity of a cylindrical tank is 6160 cm^3. Its base diameter is 28 m. The depth of this tank is

(a) 5 m (b) 10 m (c) 15 m (d) 8 m

6. The volume of a cylinder of radius r and length h is:

(a) $2\pi rh$ (b) $\frac{4}{3}\pi r^2 h$ (c) $\pi r^2 h$ (d) $2\pi r^2 h$

7. Base radius of two cylinder are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is

(a) 27 : 20 (b) 25 : 24 (c) 20 : 27 (d) 15 : 20

8. If base radius and height of a cylinder are increased by 100% then its volume increased by:

(a) 30% (b) 40% (c) 42% (d) 33.1%

9. The diameter of a sphere is 14 m. The volume of this sphere is

(a) $1437\frac{1}{3}$ m^3 (b) $1357\frac{1}{3}$ m^3 (c) $1437\frac{2}{3}$ m^3 (d) $1337\frac{2}{3}$ m^3

10. The volume of a sphere is 524 cm^3. The diameter of sphere is

(a) 5cm (b) 4cm (c) 3cm (d) 7cm

11. The total surface area of a cylinder is 40π cm^2. If height is 5.5 cm then its base radius is

(a) 5cm (b) 2.5cm (c) 1.5cm (d) 10cm

12. The area of circular base of a right circular cone is 78.5 cm^2. If its height is 12 cm then its volume is

(a) 31.4 cm^3 (b) 3.14 cm^3 (c) 314 cm^3 (d) none of these

13. The base radius of a cone is 11.3 cm and curved surface area is 355 cm^2. Its height is (Take $\pi = \frac{355}{113}$)

(a) 5 cm (b) 10 cm (c) 11 cm (d) 9 cm

MCQ WORKSHEET-VI
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. If the dimensions of a cuboid are 3 cm, 4 cm and 10 cm, then its surface area is

A. 82 cm^2 B. 123 cm^2 C. 164 cm^2 D. 216 cm^2

2. The volume of the cuboid in Q.1 is

A. 17 cm^3 B. 164 cm^3 C. 120 cm^3 D. 240 cm^3

3. The surface area of a cuboid is 1372 sq. cm. If its dimensions are in the ratio of 4 : 2 : 1, then its length is

A. 7 cm B. 14 cm C. 21 cm D. 28cm

4. The base radius and height of a right circular cylinder are 7 cm and 13.5 cm. The volume of cylinder is

A. 1579 cm^3 B. 1897 cm^3 C. 2079 cm^3 D. 2197 cm^3

5. The base radius of a cone is 5 cm and its height is 12 cm. Its slant height is

A. 13 cm B. 19.5 cm C. 26 cm D. 52cm

6. The curved surface area of a cylinder of height 14 cm is 88 sq. cm. The diameter of the cylinder is

A. 0.5 cm B. 1.0 cm C. 1.5 cm D. 2.0 cm

7. The lateral surface area of a right circular cone of height 28 cm and base radius 21 cm is

A. 1155 cm^2 B. 1055 cm^2 C. 2110 cm^2 D. 2310 cm^2

8. The circumference of the base of a 8 m high conical tent is $\frac{264}{7}$ m^2. The area of canvas required to make the tent is

A. $\frac{1360}{7}$ cm^2 B. $\frac{1360}{14}$ cm^2 C. 286 cm^2 D. 98 cm^2

9. The area of metal sheet required to make a closed hollow cone of height 24 m and base radius 7 m is

A. 176 m^2 B. 352 m^2 C. 704 m^2 D. 1408 m^2

10. The diameter of a sphere whose surface area is 346.5 cm^2 is

A. 5.25 cm B. 5.75 cm C. 11.5 cm D. 10.5 cm

11. The radius of a spherical baloon increases from 7 cm to 14 cm when air is pumped into it. The ratio of the surface area of original baloon to inflated one is

A. 1 : 2 B. 1 : 3 C. 1 : 4 D. 4 : 3

12. The circumference of the base of a cylinderical vessel is 132 cm and its height is 25 cm. If 1000 cu.cm = 1 liter, the number of litres, of water the vessel can hold is

A. 17.325 B. 34.65 C. 34.5 D. 69.30

13. The number of litres of milk a hemispherical bowl of radius 10.5 cm can hold is

A. 2.47 B. 2.476 C. 2.376 D. 3.476

14. The number of bricks, each measuring 18 cm × 12 cm × 10 cm are required to build a 1 wall 12 m × 0.6 m × 4.5 m if $\frac{1}{10}$ of its volume is taken by mortar, is

A. 15000 B. 13500 C. 12500 D. 13900

15. The radius of a sphere is 10 cm. If its radius is increased by 1 cm, the volume of the sphere is increased by

A. 13.3% B. 21.1% C. 30% D. 33.1%

MCQ WORKSHEET-VII
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The total surface area of a solid hemisphere of radius r is
(A) πr^2 (B) $2\pi r^2$ (C) $3\pi r^2$ (D) $4\pi r^2$

2. The volume and the surface area of a sphere are numerically equal, then the radius of sphere is
(A) 0 units (B) 1 units (C) 2 units (D) 3 units

3. A cylinder, a cone and a hemisphere are of the same base and of the same height. The ratio of their volumes is
(A) 1 : 2 : 3 (B) 2 : 1 : 3 (C) 3 : 1 : 2 (D) 3 : 2 : 1

4. Small spheres, each of radius 2cm, are made by melting a solid iron ball of radius 6cm, then the total number of small spheres is
(A) 9 (B) 6 (C) 27 (D) 81

5. A solid sphere of radius r cm is melted and recast into the shape of a solid cone of height r. Then the radius of the base of cone is
(A) 2r (B) r (C) 4r (D) 3r

6. Three solid spheres of diameters 6cm, 8cm and 10cm are melted to form a single solid sphere. The diameter of the new sphere is
(A) 6 cm (B) 4.5 cm (C) 3 cm (D) 12 cm

7. The radii of the ends of a frustum of a cone 40 cm high are 38 cm and 8 cm. The slant height of the frustum of cone is
(A) 50 cm (B) $10\sqrt{7}$ cm (C) 60.96 cm (D) $4\sqrt{2}$ cm

8. The circular ends of a bucket are of radii 35 cm and 14 cm and the height of the bucket is 40 cm. Its volume is
(A) 60060 cm^3 (B) 80080 cm^3 (C) 70040 cm^3 (D) 80160 cm^3

9. If the radii of the ends of a bucket are 5 cm and 15 cm and it is 24 cm high, then its surface area is
(A) 1815.3 cm^2 (B) 1711.3 cm^2 (C) 2025.3 cm^2 (D) 2360 cm^2

10. If the radii of the ends of a 42 cm high bucket are 16 cm and 11 cm, determine its capacity (take $\pi = \frac{22}{7}$)
(A) 24222 cm^3 (B) 24332 cm^3 (C) 24322 cm^3 (D) none of these

PRACTICE QUESTIONS
CLASS X: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. A cone of maximum size is carved out from a cube of edge 14 cm. Find the surface area of the cone and of the remaining solid left out after the cone carved out.

2. A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed.

3. A canal is 300 cm wide and 120 cm deep. The water in the canal is flowing with a speed of 20 km/h. How much area will it irrigate in 20 minutes if 8 cm of standing water is desired?

4. A cone of radius 4 cm is divided into two parts by drawing a plane through the mid point of its axis and parallel to its base. Compare the volumes of the two parts.

5. Three cubes of a metal whose edges are in the ratio 3:4:5 are melted and converted into a single cube whose diagonal is $12\sqrt{3}$ cm. Find the edges of the three cubes.

6. Three metallic solid cubes whose edges are 3 cm, 4 cm and 5 cm are melted and formed into a single cube. Find the edge of the cube so formed.

7. How many shots each having diameter 3 cm can be made from a cuboidal lead solid of dimensions 9cm × 11cm × 12cm?

8. A bucket is in the form of a frustum of a cone and holds 28.490 litres of water. The radii of the top and bottom are 28 cm and 21 cm, respectively. Find the height of the bucket.

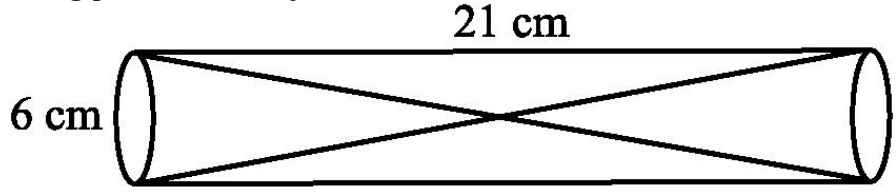
9. A cone of radius 8 cm and height 12 cm is divided into two parts by a plane through the mid-point of its axis parallel to its base. Find the ratio of the volumes of two parts.

10. Two identical cubes each of volume 64 cm3 are joined together end to end. What is the surface area of the resulting cuboid?

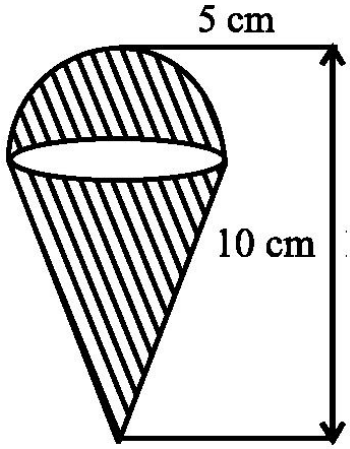
11. From a solid cube of side 7 cm, a conical cavity of height 7 cm and radius 3 cm is hollowed out. Find the volume of the remaining solid.

12. Two cones with same base radius 8 cm and height 15 cm are joined together along their bases. Find the surface area of the shape so formed.

13. Two solid cones A and B are placed in a cylindrical tube as shown in the below figure. The ratio of their capacities is 2:1. Find the heights and capacities of cones. Also, find the volume of the remaining portion of the cylinder.



14. An ice cream cone full of ice cream having radius 5 cm and height 10 cm as shown in the below figure. Calculate the volume of ice cream, provided that its $\frac{1}{6}$ part is left unfilled with ice cream.



15. Marbles of diameter 1.4 cm are dropped into a cylindrical beaker of diameter 7 cm containing some water. Find the number of marbles that should be dropped into the beaker so that the water level rises by 5.6 cm.

16. How many spherical lead shots each of diameter 4.2 cm can be obtained from a solid rectangular lead piece with dimensions 66 cm, 42 cm and 21 cm.

17. How many spherical lead shots of diameter 4 cm can be made out of a solid cube of lead whose edge measures 44 cm.

18. A wall 24 m long, 0.4 m thick and 6 m high is constructed with the bricks each of dimensions 25 cm × 16 cm × 10 cm. If the mortar occupies $\frac{1}{10}$th of the volume of the wall, then find the number of bricks used in constructing the wall.

19. Find the number of metallic circular disc with 1.5 cm base diameter and of height 0.2 cm to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.

20. A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity and surface area of the bucket. Also, find the cost of milk which can completely fill the container, at the rate of Rs 25 per litre (use $\pi = 3.14$).

21. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 4 cm and the diameter of the base is 8 cm. Determine the volume of the toy. If a cube circumscribes the toy, then find the difference of the volumes of cube and the toy. Also, find the total surface area of the toy.

22. A solid metallic hemisphere of radius 8 cm is melted and recasted into a right circular cone of base radius 6 cm. Determine the height of the cone.

23. A rectangular water tank of base 11 m × 6 m contains water upto a height of 5 m. If the water in the tank is transferred to a cylindrical tank of radius 3.5 m, find the height of the water level in the tank.

24. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to $\frac{2}{3}$ of the total height of the building. Find the height of the building, if it contains $67\frac{1}{21}\text{m}^3$ of air.

25. How many cubic centimetres of iron is required to construct an open box whose external dimensions are 36 cm, 25 cm and 16.5 cm provided the thickness of the iron is 1.5 cm. If one cubic cm of iron weighs 7.5 g, find the weight of the box.

26. The barrel of a fountain pen, cylindrical in shape, is 7 cm long and 5 mm in diameter. A full barrel of ink in the pen is used up on writing 3300 words on an average. How many words can be written in a bottle of ink containing one fifth of a litre?

27. Water flows at the rate of 10m/minute through a cylindrical pipe 5 mm in diameter. How long would it take to fill a conical vessel whose diameter at the base is 40 cm and depth 24 cm?

28. A heap of rice is in the form of a cone of diameter 9 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

29. A factory manufactures 120000 pencils daily. The pencils are cylindrical in shape each of length 25 cm and circumference of base as 1.5 cm. Determine the cost of colouring the curved surfaces of the pencils manufactured in one day at Rs 0.05 per dm2.

30. Water is flowing at the rate of 15 km/h through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in pond rise by 21 cm?

31. A solid iron cuboidal block of dimensions 4.4 m × 2.6 m × 1m is recast into a hollow cylindrical pipe of internal radius 30 cm and thickness 5 cm. Find the length of the pipe.

32. 500 persons are taking a dip into a cuboidal pond which is 80 m long and 50 m broad. What is the rise of water level in the pond, if the average displacement of the water by a person is 0.04m3?

33. 16 glass spheres each of radius 2 cm are packed into a cuboidal box of internal dimensions 16 cm × 8 cm × 8 cm and then the box is filled with water. Find the volume of water filled in the box.

34. A milk container of height 16 cm is made of metal sheet in the form of a frustum of a cone with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk at the rate of Rs. 22 per litre which the container can hold.

35. A cylindrical bucket of height 32 cm and base radius 18 cm is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

36. A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use $\pi = 3.14$].

37. A building is in the form a cylinder surmounted by a hemispherical vaulted dome and contains $41\frac{19}{21}$ m3 of air. If the internal diameter of dome is equal to its total height above the floor, find the height of the building?

38. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled into cylindrical shaped bottles each of radius 1.5 cm and height 4 cm. How many bottles are needed to empty the bowl?

39. A solid right circular cone of height 120 cm and radius 60 cm is placed in a right circular cylinder full of water of height 180 cm such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is equal to the radius of the cone.

40. Water flows through a cylindrical pipe, whose inner radius is 1 cm, at the rate of 80 cm/sec in an empty cylindrical tank, the radius of whose base is 40 cm. What is the rise of water level in tank in half an hour?

41. The rain water from a roof of dimensions 22 m 20 m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the rain water collected from the roof just fill the cylindrical vessel, then find the rainfall in cm.

42. A pen stand made of wood is in the shape of a cuboid with four conical depressions and a cubical depression to hold the pens and pins, respectively. The dimension of the cuboid are 10 cm, 5 cm and 4 cm. The radius of each of the conical depressions is 0.5 cm and the depth is 2.1 cm. The edge of the cubical depression is 3 cm. Find the volume of the wood in the entire stand.

43. A cone of radius 10cm is divided into two parts by drawing a plane through the midpoint of its axis, parallel to its base. Compare the volume of the two parts.

44. A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ of the curved surface of the whole cone. Find the ratio of the line segments into which the cone's altitude is divided by the plane.

45. From a solid cylinder of height 24cm and diameter 10cm, two conical cavities of same radius as that of the cylinder are hollowed out. If the height of each conical activity is half the height of cylinder, find the total surface area of the remaining cylinder.

46. A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank to her field, which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3km/hr, in how much time will the tank be filled?

47. A toy is in the form of a cone on a hemi-sphere of diameter 7 cm. The toal height of the top is 14.5cm. Find the volume and total surface area of the toy.

48. A vessel in the form of hemi-spherical is mounted by a hollow cylinder. The diameter of the bowl is 14cm and the total height of the vessel is 13 cm. Find the capacity of the vessel.

49. A cylindrical with radius and height is 4cm and 8cm is filled with Ice-cream and ice-cream is distributed to 10 Children in equal can having hemi-spherical tops. If the height of the conical portion is 4 times the radius of its base, find the radius of the ice-cream cone.

50. A tent has cylindrical surmounted by a conical roof. The radius of the cylindrical base is 20m. The total height of tent is 6.3m and height of cylindrical portion is 4.2m, find the volume and surface area of tent.

51. Rasheed got a playing top (*lattu*) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area he has to colour. (Take $\pi = 22/7$)

52. A wooden toy rocket is in the shape of a cone mounted on a cylinder. The height of the entire rocket is 26 cm, while the height of the conical part is 6 cm. The base of the conical portion has a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours. (Take $\pi = 3.14$)

53. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

54. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m^2

55. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm2.

56. A juice seller was serving his customers using glasses. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Take $\pi = 3.14$)

57. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volumes of the cylinder and the toy. (Take $\pi = 3.14$)

58. A *gulab jamun,* contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 *gulab jamuns,* each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm.

59. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand.

60. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.

61. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8g mass. (Use $\pi = 3.14$)

62. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

63. A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter; the diameter of the spherical part is 8.5 cm. By measuring the amount of water it holds, a child finds its volume to be 345 cm3. Check whether she is correct, taking the above as the inside measurements, and $\pi = 3.14$.

64. A cone of height 24 cm and radius of base 6 cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

65. Selvi's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (an underground tank) which is in the shape of a cuboid. The sump has dimensions 1.57 m × 1.44 m × 95cm. The overhead tank has its radius 60 cm and height 95 cm. Find the height of the water left in the sump after the overhead tank has been completely filled with water from the sump which had been full. Compare the capacity of the tank with that of the sump. (Use $\pi = 3.14$)

66. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

67. A hemispherical tank full of water is emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = 22/7$)

68. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

69. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.

70. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

71. How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm × 10 cm × 3.5 cm?

72. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

73. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?

74. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?

75. Hanumappa and his wife Gangamma are busy making jaggery out of sugarcane juice. They have processed the sugarcane juice to make the molasses, which is poured into moulds in the shape of a frustum of a cone having the diameters of its two circular faces as 30 cm and 35 cm and the vertical height of the mould is 14 cm. If each cm3 of molasses has mass about 1.2 g, find the mass of the molasses that can be poured into each mould. (Take $\pi = 22/7$)

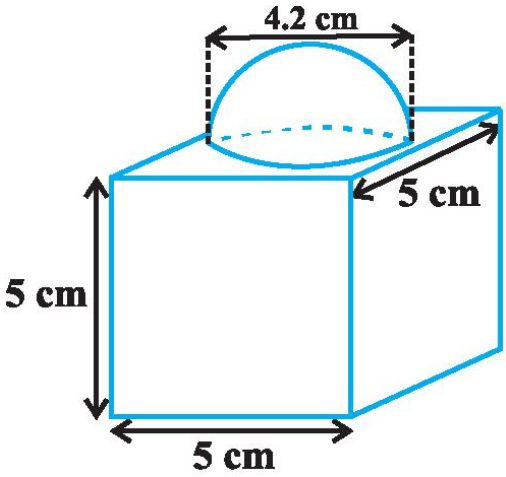
76. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet. The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water the bucket can hold.

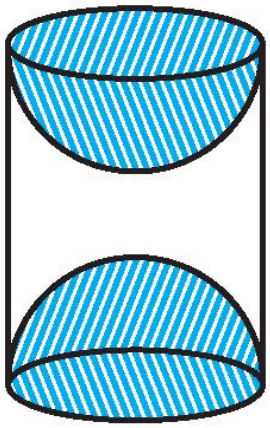
77. A container, opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm, respectively. Find the cost of the milk which can completely fill the container, at the rate of Rs 20 per litre. Also find the cost of metal sheet used to make the container, if it costs Rs 8 per 100 cm2. (Take $\pi = 3.14$)

78. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.

79. A right triangle, whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.

80. The decorative block shown in Fig. is made of two solids - a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block. (Take $\pi = 22/7$).



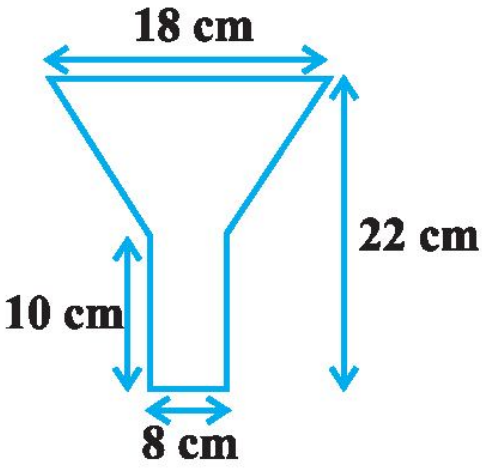


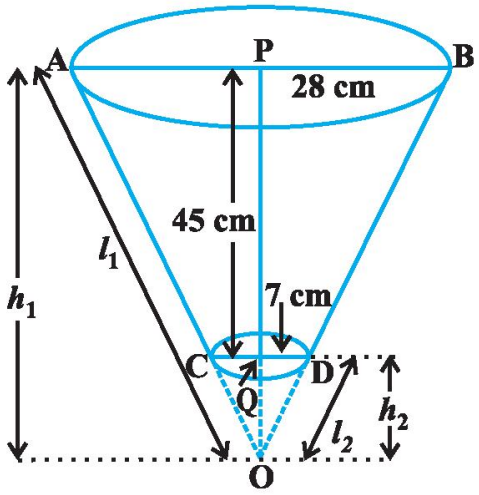
81. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in above Fig.. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.

82. A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. find the diameter of the cylindrical vessel.

83. An iron pillar has lower part in the form of a right circular cylinder and the upper part is in the form of a right circular cone. The radius of the base of the cone and cylinder is 8cm. The cylindrical part is 240cm high and the conical part is 36cm high. Find the weight of the pillar if 1 cm^3 of iron weighs 7.5 grams.

84. An oil funnel made of tin sheet consists of a 10 cm long cylindrical portion attached to a frustum of a cone. If the total height is 22 cm, diameter of the cylindrical portion is 8 cm and the diameter of the top of the funnel is 18 cm, find the area of the tin sheet required to make the funnel (see below figure)





85. The radii of the ends of a frustum of a cone 45 cm high are 28 cm and 7 cm (see above sided Fig). Find its volume, the curved surface area and the total surface area. (Take $\pi = 22/7$)

MCQ WORKSHEET-I
CLASS X: CHAPTER - 15
PROBABILITY

1. There are 6 marbles in a box with number 1 to6 marked on each of them . What is the probability of drawing a marble with number 2 ?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) 1

2. A coin is flipped to decide which team starts the game . What is the probability of your team will start ?

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

3. A die is thrown once . What will be the probability of getting a prime number ?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

Cards are marked with numbers 1 to 25 are placed in the box and mixed thoroughly. One card is drawn at random from the box. Answer the following questions (Q4-Q13)

4. What is the probability of getting a number 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

5. What is the probability of getting a number less than 11?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

6. What is the probability of getting a number greater than 25?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

7. What is the probability of getting a multiple of 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

8. What is the probability of getting an even number?

(a) 1 (b) 0 (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

9. What is the probability of getting an odd number?

(a) 1 (b) 0 (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

10. What is the probability of getting a prime number?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

11. What is the probability of getting a number divisible by 3?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

12. What is the probability of getting a number divisible by 4?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

13. What is the probability of getting a number divisible by 7?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

14. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a red ball?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

15. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a yellow ball?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

MCQ WORKSHEET-II
CLASS X: CHAPTER - 15
PROBABILITY

A box contains 3 blue, 2 white, and 5 red marbles. If a marble is drawn at *random* from the box, then answer the questions from 1 to 5.

1. What is the probability that the marble will be white?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) 1

2. What is the probability that the marble will be red?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

3. What is the probability that the marble will be blue?

(a) $\frac{3}{10}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

4. What is the probability that the marble will be any one colour?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

5. What is the probability that the marble will be red or blue?

(a) 1 (b) $\frac{4}{5}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

A die is thrown once, then answer the questions from 6 to 10.

6. Find the probability of getting a prime number

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

7. Find the probability of getting a number lying between 2 and 6

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

8. Find the probability of getting an odd number.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

9. Find the probability of getting an even number.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

10. Find the probability of getting a number greater than 4.

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

MCQ WORKSHEET-III
CLASS X: CHAPTER - 15
PROBABILITY

A box contains 5 red marbles, 6 white marbles and 4 green marbles. If a marble is drawn at *random* from the box, then answer the questions from 1 to 6.

1. What is the probability that the marble will be white?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

2. What is the probability that the marble will be red?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

3. What is the probability that the marble will be green?

(a) 0.3 (b) $\frac{1}{2}$ (c) 1 (d) none of these

4. What is the probability that the marble will be any one colour?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

5. What is the probability that the marble will be red or green?

(a) $\frac{2}{5}$ (b) $\frac{3}{25}$ (c) $\frac{1}{5}$ (d) none of these

6. What is the probability that the marble will be blue?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

Cards are marked with numbers 1 to 50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. Answer the following questions from 7 to 15.

7. What is the probability of getting a number 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

8. What is the probability of getting a number less than 11?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

9. What is the probability of getting a number greater than 50?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

10. What is the probability of getting a multiple of 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

11. What is the probability of getting an even number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

12. What is the probability of getting an odd number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

13. What is the probability of getting a prime number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{4}{10}$ (d) $\frac{3}{10}$

14. What is the probability of getting a number divisible by 3?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

15. What is the probability of getting a number divisible by 4?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

16. What is the probability of getting a number divisible by 7?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

MCQ WORKSHEET-IV
CLASS X: CHAPTER - 15
PROBABILITY

1. A coin is tossed 1000 times and 560 times a "head" occurs. The empirical probability of occurrence of a Head in this case is

A. 0.5 B. 0.56 C. 0.44 D. 0.056

2. Two coins are tossed 200 times and the following out comes are recorded

HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one Head in the above case

A. 0.33 B. 0.34 C. 0.66 D. 0.83

A die is thrown 200 times and the following outcomes are noted, with their frequencies:

Outcome	1	2	3	4	5	6
Frequency	56	22	30	42	32	18

3. What is the empirical probability of getting a 1 in the above case.

A. 0.28 B. 0.22 C. 0.15 D. 0.21

4. What is the empirical probability of getting a number less than 4 ?

A. 0.50 B. 0.54 C. 0.46 D. 0.52

5. What is the empirical probability. of getting a number greater than 4.

A. 0.32 B. 0.25 C. 0.18 D. 0.30

6. On a particular day, the number of vehicles passing a crossing is given below :

Vehicle	Two wheeler	Three wheeler	Four wheeler
Frequency	52	71	77

What is the probability of a two wheeler passing the crossing on that day ?

A. 0.26 B. 0.71 C. 0.385 D. 0.615

7. The following table shows the blood-group of 100 students

Blood group	A	B	O	AB	B^+
Number of Students	12	23	35	20	10

One student is taken at random. What is probability that his blood group is B^+

A. 0.12 B. 0.35 C. 0.20 D. 0.10

8. In a bag, there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is

A. 0.50 B. 0.70 C. 0.30 D. None of these

9. On a page of telephone directory having 250 telephone numbers, the Frequency of the unit digits of those number are given below :

0	1	2	3	4	5	6	7	8	9
18	22	32	28	40	30	30	22	18	10

A telephone number is selected from the page at random. What is the probability that its unit digit is

(*a*)2

A. 0.16 B. 0.128 C. 0.064 D. 0.04

(*b*) More than 6

A. 0.20 B. 0.25 C. 0.32 D. 0.16

(*c*) less than 2

A. 0.16 B. 0.18 C. 0.22 D. 0.32

10. 10 defective pens are accidentally mixed with 90 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

A. 0.10 B. 0.20 C. 0.90 D. 1.0

MCQ WORKSHEET-V
CLASS X: CHAPTER - 15
PROBABILITY

One card is drawn from a well-shuffled deck of 52 cards. Answer the question from 1 to 12.

1. Find the probability of getting a king of red colour

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

2. Find the probability of getting a face card.

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{13}$

3. Find the probability of getting a black face card

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

4. Find the probability of getting an ace.

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

5. Find the probability of getting a black card.

(a) $\frac{1}{2}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

6. Find the probability of getting a face card or an ace.

(a) $\frac{4}{13}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{13}$

7. Find the probability of getting face card or black card.

(a) $\frac{4}{13}$ (b) $\frac{8}{13}$ (c) $\frac{7}{13}$ (d) $\frac{3}{13}$

8. Find the probability of getting a king or red card.

(a) $\frac{4}{13}$ (b) $\frac{8}{13}$ (c) $\frac{7}{13}$ (d) $\frac{3}{13}$

9. Find the probability of getting a king and red card.

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

10. Find the probability of getting a king or queen card.

(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY : DICE BASED QUESTIONS

1. An unbiased die is thrown. What is the probability of getting
- **a).** an even number
- **b).** a multiple of 3
- **c).** a multiple of 2 or 3
- **d).** a number less than 5 divisible by 2.
- **e).** A number greater than 2 divisible by 3.
- **f).** an even number or a multiple of 3
- **g).** an even number and a multiple of 3
- **h).** a number 3 or 4
- **i).** an odd number
- **j).** a number less than 5
- **k).** a number greater than 3
- **l).** a number between 3 and 6.

2. Two dice are thrown together. Find the probability that the product of the numbers on the top of the dice is (i) 6 (ii) 12 (iii) 7

3. Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is less than 9.

4. Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3, respectively. They are thrown and the sum of the numbers on them is noted. Find the probability of getting each sum from 2 to 9 separately.

5. Two dice are thrown at the same time. Determine the probabiity that the difference of the numbers on the two dice is 2.

6. Two dice are thrown at the same time. Find the probability of getting (i) same number on both dice. (ii) different numbers on both dice.

7. Two dice are thrown simultaneously. What is the probability that the sum of the numbers appearing on the dice is (i) 7? (ii) a prime number? (iii) 1?

8. Two dice are thrown simultaneously. Find the probability of getting
- **a).** an even number on first dice
- **b).** an odd number on first dice
- **c).** an even number as the sum
- **d).** a multiple of 5 as the sum
- **e).** a multiple of 7 as the sum
- **f).** a multiple of 3 as the sum
- **g).** a sum more than 7
- **h).** a sum greater than 9
- **i).** neither the sum 9 nor the sum 11 as the sum
- **j).** a sum less than 6

k). a sum less than 7
l). a sum more than 7
m). a multiple of 3 on one dice
n). a multiple of 2 on one dice
o). a multiple of 5 on one dice
p). a multiple of 2 on one dice and a multiple of 3 on the other
q). a doublet
r). a doublet of even number
s). a doublet of odd number
t). a doublet of prime number
u). a number other than 5 on any dice
v). a number other than 3 on any dice
w). the sum equal to 12.
x). the sum greater than equal to 10
y). the sum less than or equal to 10
z). the sum as a prime number

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY
PLAYING CARDS BASED QUESTIONS

1. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

a. an ace card
b. a red card
c. either red or king card
d. red and a king
e. '2' of spades
f. '10' of a black suit
g. a queen of black suit
h. either a black card or a king
i. black and king card
j. a jack, queen or a king
k. a heart card
l. a queen card
m. the ace of spades
n. the seven of clubs
o. a ten
p. a black card
q. neither a heart nor a king
r. neither an ace nor a king
s. neither a red card nor a queen card
t. a face card or an ace
u. a face card or a black card
v. a face card and a black card
w. neither a face card nor an ace
x. neither a face card nor '10' card
y. either a king or red card
z. either an ace or black card
aa. an ace and a black card
bb. a king of red colour card
cc. a face card
dd. a red face card
ee. the jack of hearts
ff. a spade card
gg. the queen of diamonds
hh. '9' of black suit
ii. a face card or spade card

2. Five cards—the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.

a. What is the probability that the card is the queen?
b. If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?

3. The king , queen and jack of clubs are removed from a pack of 52 playing cards. One card is selected at random from the remaining cards. Find the probability that the card is

a. neither a heart nor a king
b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a king card
g. a heart card
h. a red card
i. a black card
j. a spade card
k. a diamond card
l. a club card
m. either an ace card or black card
n. an ace card
o. a face card
p. a face card with red colour
q. neither '10' card nor an ace
r. an even number card
s. an odd number card
t. not a natural number.

4. All spades are removed from a well shuffled deck of 52 cards and then one card is drawn randomly from the remaining cards. Find the probability of getting

a. neither a heart nor a king
b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a red card
g. a black card
h. a spade card
i. a diamond card
j. a club card
k. either an ace card or black card
l. an ace card
m. a face card with red colour
n. neither '10' card nor an ace
o. an even number card
p. a face card
q. an odd number card

5. All face cards are removed from a well shuffled deck of 52 cards and then one card is drawn randomly from the remaining cards. Find the probability of getting

a. neither a heart nor a king

b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a red card
g. a black card
h. a spade card
i. a diamond card
j. a club card
k. either an ace card or black card
l. an ace card
m. a face card with red colour
n. neither '10' card nor an ace
o. an even number card
p. an odd number card

6. All cards of ace, jack and queen are removed from a deck of playing cards. One card is drawn at random from the remaining cards, find the probability that the card drawn

a. neither a heart nor a king
b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a king card
g. a heart card
h. a red card
i. a black card
j. a spade card
k. a diamond card
l. a club card
m. either an ace card or black card
n. an ace card
o. a face card
p. a face card with red colour
q. neither '10' card nor an ace
r. an even number card
s. an odd number card
t. not a natural number.

7. All cards of '10', an ace and queen cards are removed from a well shuffled deck of 52 cards and then one card is drawn randomly from the remaining cards. Find the probability of getting

a. neither a heart nor a king
b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a king card
g. a heart card

h. a red card
i. a black card
j. a spade card
k. a diamond card
l. a club card
m. either an ace card or black card
n. an ace card
o. a face card
p. a face card with red colour
q. neither ‘10’ card nor an ace
r. an even number card
s. an odd number card
t. not a natural number.

8. Five cards—the ten, jack, queen, king and ace of diamonds, are removed from the well-shuffled 52 playing cards. One card is then picked up at random. Find the probability of getting

a. neither a heart nor a king
b. neither an ace nor a king
c. neither a red card nor a queen card
d. a black card or an ace.
e. either a heart or a spade card
f. a king card
g. a heart card
h. a red card
i. a black card
j. a spade card
k. a diamond card
l. a club card
m. either an ace card or black card
n. an ace card
o. a face card
p. a face card with red colour
q. neither ‘10’ card nor an ace
r. an even number card
s. an odd number card
t. not a natural number.

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY : COINS BASED QUESTIONS

1. Two coins are tossed simultaneously. Find the probability of getting
- **i).** at least one head
- **ii).** at most one head
- **iii).** exactly two head
- **iv).** exactly one head
- **v).** no head
- **vi).** no tail
- **vii).** at least one tail
- **viii).** at most one tail
- **ix).** exactly two tails
- **x).** exactly one tail

2. A coin is tossed two times. Find the probability of getting at most one head.

3. A coin is tossed 3 times. List the possible outcomes. Find the probability of getting (i) all heads (ii) at least 2 heads

4. Sushma tosses a coin 3 times and gets tail each time. Do you think that the outcome of next toss will be a tail? Give reasons.

5. If I toss a coin 3 times and get head each time, should I expect a tail to have a higher chance in the 4th toss? Give reason in support of your answer.

6. Three coins are tossed simultaneously. What is the probability of getting
- **i).** exactly two heads
- **ii).** at least two heads
- **iii).** at most two heads
- **iv).** one head or two heads
- **v).** exactly one tail
- **vi).** at least one tail
- **vii).** at most one tail
- **viii).** at least two tails
- **ix).** at most two tails
- **x).** exactly two tails
- **xi).** no head
- **xii).** no tail

7. Four coins are tossed simultaneously. What is the probability of getting
- **i).** exactly one head
- **ii).** exactly two heads
- **iii).** exactly three heads
- **iv).** at least one head
- **v).** at most one head

vi). at least three heads
vii). at most three heads
viii). at least two heads
ix). at most two heads
x). one head or two heads
xi). exactly one tail
xii). at least one tail
xiii). at most one tail
xiv). at least two tails
xv). at most two tails
xvi). at least three tails
xvii). at most three tails
xviii). exactly two tails
xix). no head
xx). no tail

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY
BAG BALLS BASED QUESTIONS

1. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is

1. red ?
2. not red?

2. A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag, find the probability of getting

1. a white ball or a green ball
2. neither green ball nor red ball.
3. not green?
4. not red?
5. not white?
6. neither red ball nor white ball?

3. A bag contains 5 red balls, 8 white balls and 4 green balls. One ball is taken out of the bag at random. What is the probability that the ball taken out will be

1. red ?
2. white ?
3. not green?
4. not red?
5. not white?
6. neither red ball nor white ball?

4. A box contains 3 blue, 2 white, and 4 red balls. If a ball is drawn at *random* from the box, what is the probability that it will be

1. white?
2. blue?
3. red?
4. neither blue ball nor red ball?
5. neither blue ball nor white ball?
6. neither white ball nor red ball?
7. not blue?
8. not red?
9. not white?

5. A bag contains 4 blue, 5 black, 6 red and 5 white balls. One ball is taken out of the bag at random. What is the Probability that it will be

1. black?
2. blue?
3. red?
4. white?
5. black or blue?
6. white or blue?

7. red or blue?
8. white or red?
9. neither blue ball nor red ball?
10. neither red ball nor white ball?
11. neither blue ball nor black ball?
12. not blue ball?
13. not red ball?
14. not white ball?
15. not black ball?

6. A bag contains 9 blue, 4 black, 5 red and 7 white balls. One ball is taken out of the bag and found red ball then again one ball is taken out at random from the remaining. What is the Probability that it will be

1. black?
2. blue?
3. red?
4. white?
5. black or blue?
6. white or blue?
7. red or blue?
8. white or red?
9. neither blue ball nor red ball?
10. neither red ball nor white ball?
11. neither blue ball nor black ball?
12. not blue ball?
13. not red ball?
14. not white ball?
15. not black ball?

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY : NUMBER BASED QUESTIONS

1. On one page of a telephone directory, there were 200 telephone numbers. The frequency distribution of their unit place digit (for example, in the number 25828573, the unit place digit is 3) is given in below table:

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	22	26	22	22	20	10	14	28	16	20

Without looking at the page, the pencil is placed on one of these numbers, i.e., the number is chosen at *random*. What is the probability that the digit in its unit place is (i) an odd number (ii) a prime number and (iii) a number greater than 4.?

2. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). neither divisible by 5 nor 10.
n). neither divisible by 2 nor 5.
o). neither divisible by 3 nor 5.
p). a perfect cube number.
q). a prime number
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

3. Cards are marked with numbers 4, 5, 6, …….50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.

l). a two digit number perfect square.
m). neither divisible by 5 nor 10.
n). neither divisible by 2 nor 5.
o). neither divisible by 3 nor 5.
p). a perfect cube number.
q). a prime number
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

4. Cards are marked with numbers 13, 14, 15, …….60 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

5. There are 30 cards numbered from1 to 30. One card is drawn at random. Find the probability of getting the card with

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.

p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

6. A box contains 25 cards numbered from 1 to 25. A card is drawn from the box at random. Find the probability of getting the card with

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

7. A box contains 19 balls bearing numbers 1,2,3, …. 19 respectively. A ball is drawn at random from the box, Find the probability that the number on the ball is

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.

t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

8. A box contains 20 balls bearing numbers 1,2,3, …. 20 respectively. A ball is drawn at random from the box, Find the probability that the number on the ball is

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

9. 15 cards numbered 1, 2, 3, 4,……. 14, 15 are put in a box and mixed thoroughly. A man draws a card at random from the box. Find the probability that the number on the card is

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

10. Tickets numbered 2, 3, 4, 5, …..100, 101 are placed in a box and mixed thoroughly. One ticket is drawn at random from the box. Find the probability that the number on the ticket is

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

11. Cards are marked with numbers 5, 6, 7, …….50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting

a). a two-digit number
b). a perfect square number
c). a number divisible by 5.
d). a number divisible by 2 or 3.
e). a number divisible by 2 and 3.
f). a number divisible by 7.
g). a number multiple of 8.
h). a two digit number divisible by 5.
i). a two digit number divisible by 2.
j). a two digit number divisible by 3.
k). a two digit number divisible by 4.
l). a two digit number perfect square.
m). a perfect cube number.
n). a prime number.
o). neither divisible by 5 nor 10.
p). neither divisible by 2 nor 5.
q). neither divisible by 3 nor 5.
r). a two digit prime number.
s). an even prime number.
t). a number is not divisible by 5.
u). a number is not divisible by 3.
v). a number is not divisible by 2 and 3.

PRACTICE QUESTIONS
CLASS X : CHAPTER – 15
PROBABILITY
LOGICAL REASONING BASED QUESTIONS

1. Why is tossing a coin considered to be a fair way of deciding which team should get the ball at the beginning of a football game?

2. The probability that it will rain today is 0.84. What is the probability that it will not rain today?

3. What is the probability that an ordinary year has 53 Sundays?

4. Find the probability of getting 53 Fridays in a leap year.

5. Find the probability of getting 53 Fridays or 53 Saturdays in a leap year.

6. Find the probability of getting 53 Mondays or 53 Tuesday in an ordinary year.

7. Out of 400 bulbs in a box, 15 bulbs are defective. One bulb is taken out at random from the box. Find the probability that the drawn bulb is not defective.

8. In a lottery there are 10 prizes and 25 blanks. What is the probability of getting a prize?

9. 250 lottery tickets were sold and there are 5 prizes on these tickets. If Mahesh purchased one lottery ticket, what is the probability that he wins a prize?

10. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times. (i) What is the probability that on a given day it was correct? (ii) What is the probability that it was not correct on a given day?

11. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

12. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green?

13. Savita and Hamida are friends. What is the probability that both will have (i) different birthdays? (ii) the same birthday? (ignoring a leap year).

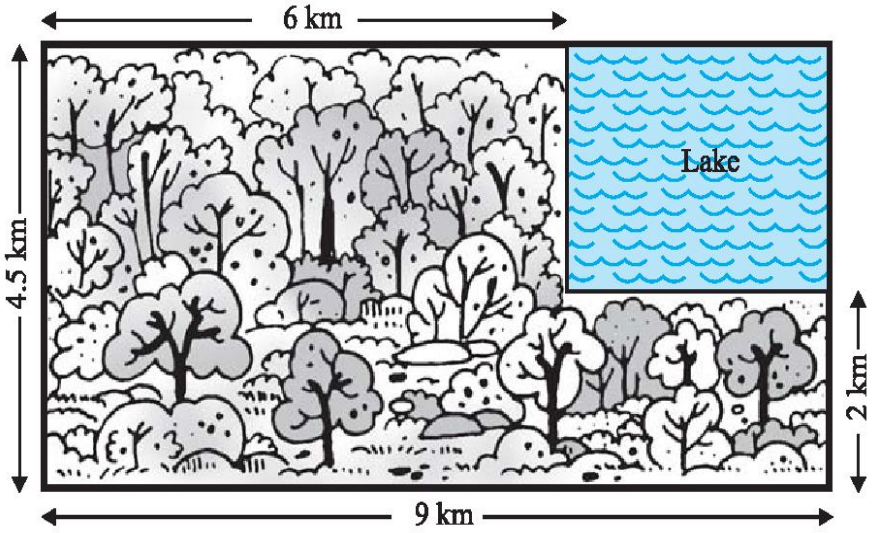
14. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

15. A piggy bank contains hundred 50p coins, fifty Re 1 coins, twenty Rs 2 coins and ten Rs 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50 p coin ? (ii) will not be a Rs 5 coin?

16. Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish. What is the probability that the fish taken out is a male fish?

17. A number x is selected from the numbers 1, 2, 3 and then a second number y is randomly selected from the number 1, 4, 9. What is the probability that the product xy of the two numbers will be less than 9?

18. A missing helicopter is reported to have crashed somewhere in the rectangular region shown in Fig. What is the probability that it crashed inside the lake shown in the figure?



19. There are 40 students in Class X of a school of whom 25 are girls and 15 are boys. The class teacher has to select one student as a class representative. She writes the name of each student on a separate card, the cards being identical. Then she puts cards in a bag and stirs them thoroughly. She then draws one card from the bag. What is the probability that the name written on the card is the name of (i) a girl? (ii) a boy?

20. A carton consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Jimmy, a trader, will only accept the shirts which are good, but Sujatha, another trader, will only reject the shirts which have major defects. One shirt is drawn at random from the carton. What is the probability that (i) it is acceptable to Jimmy? (ii) it is acceptable to Sujatha?

21. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?

22. Two customers are visiting a particular shop in the same week (Monday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?

23. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is *double* that of a red ball, determine the number of blue balls in the bag.

24. A box contains 12 balls out of which *x* are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find *x*.

25. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

26. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

27. A jar contains 54 marbles, each of which is blue, green or white. If a marble is drawn at random from the jar, the probability that it is green is $\frac{1}{3}$ and that of getting a blue marble is $\frac{4}{9}$. Find the number of white marbles in the jar.

28. A letter is chosen at random from the letters of the word 'ASSASSINATION'. Find the probability that the letter chosen is a (i) vowel (ii) consonant (iii) A (iv) S (v) N.

29. A letter is chosen at random from the letters of the word 'INDEPENDENCE'. Find the probability that the letter chosen is a (i) vowel (ii) consonant (iii) E (iv) N (v) D.

30. A letter is chosen at random from the letters of the word 'MATHEMATICS'. Find the probability that the letter chosen is a (i) vowel (ii) consonant (iii) A (iv) T (v) M.

31. A letter of English alphabets is chosen at random. Determine the probability that the letter is a consonant.

32. There are 1000 sealed envelopes in a box, 10 of them contain a cash prize of Rs 100 each, 100 of them contain a cash prize of Rs 50 each and 200 of them contain a cash prize of Rs 10 each and rest do not contain any cash prize. If they are well shuffled and an envelope is picked up out, what is the probability that it contains no cash prize?

33. Box A contains 25 slips of which 19 are marked Re 1 and other are marked Rs 5 each. Box B contains 50 slips of which 45 are marked Re 1 each and others are marked Rs 13 each. Slips of both boxes are poured into a third box and reshuffled. A slip is drawn at random. What is the probability that it is marked other than Re 1?

34. A carton of 24 bulbs contain 6 defective bulbs. One bulbs is drawn at random. What is the probability that the bulb is not defective? If the bulb selected is defective and it is not replaced and a second bulb is selected at random from the rest, what is the probability that the second bulb is defective?

35. A child's game has 8 triangles of which 3 are blue and rest are red, and 10 squares of which 6 are blue and rest are red. One piece is lost at random. Find the probability that it is a (i) triangle (ii) square (iii) square of blue colour (iv) triangle of red colour

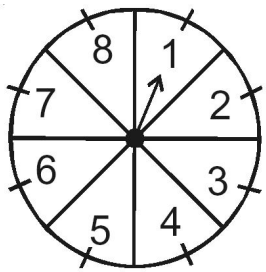
36. In a game, the entry fee is Rs 5. The game consists of a tossing a coin 3 times. If one or two heads show, Sweta gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. For tossing a coin three times, find the probability that she (i) loses the entry fee. (ii) gets double entry fee. (iii) just gets her entry fee.

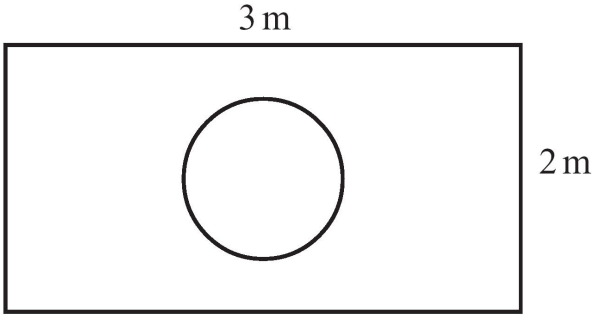
37. A die has its six faces marked 0, 1, 1, 1, 6, 6. Two such dice are thrown together and the total score is recorded. (i) How many different scores are possible? (ii) What is the probability of getting a total of 7?

38. A lot consists of 48 mobile phones of which 42 are good, 3 have only minor defects and 3 have major defects. Varnika will buy a phone if it is good but the trader will only buy a mobile if it has no major defect. One phone is selected at random from the lot. What is the probability that it is (i) a good phone (ii) a bad phone

39. (i) A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective?
(ii) Suppose the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn at random from the rest. What is the probability that this bulb is not defective ?

40. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see Fig.), and these are equally likely outcomes. What is the probability that it will point at (i) 8 ? (ii) an odd number? (iii) a number greater than 2? (iv) a number less than 9?





41. Suppose you drop a die at random on the rectangular region shown in above right-sided figure. What is the probability that it will land inside the circle with diameter 1m?

42. A child has a die whose six faces show the letters as given below:

A	B	C	D	E	A

The die is thrown once. What is the probability of getting (i) A? (ii) D?

43. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

BLUE PRINT : SA-II (X) : MATHEMATICS

Unit/Topic	MCQ (1 mark)	Short answer (2 marks)	Short answer (2 marks)	Long answer (2 marks)	Total
Algebra Quadratic Equations & Arithmetic Progression	2(2)	4(2)	9(3)	8(2)	**23(9)**
Geometry Circles & Construction	1(1)	2(1)	6(2)	8(2)	**17(6)**
Trigonometry Heights & Distances	-	-	-	8(2)	**08(2)**
Probability	1(1)	-	3(1)	4(1)	**08(3)**
Coordinate Geometry	2(2)	2(1)	3(1)	4(1)	**11(5)**
Mensuration Areas related to Circles & Surface Areas and Volumes	2(2)	4(2)	9(3)	8(2)	**23(9)**
Total	8(8)	12(6)	30(10)	40(10)	**90(34)**

SAMPLE PAPER – I

Class – X **Max. Marks: 90**
Subject: Mathematics **Time Allowed: 3 hrs**

General Instruction:

(i) All questions are compulsory.
(ii) The question paper consists of 34 questions divided into four sections A, B. C and D.
(iii) Section A contains 8 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 10 questions of 4 marks each.
(iv) Use of calculator is not permitted.

SECTION – A

Question numbers 1 to 8 carry 1mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. If $p - 1$, $p + 3$, $3p - 1$ are in AP, then p is equal to
(a) 4 (b) – 4 (c) 2 (d) – 2

2. If 2 is the root of the equation $x^2 + bx + 12 = 0$ and the equation $x^2 + bx + q = 0$ has equal roots then q =
(a) 8 (b) 16 (c) –8 (d) –16

3. Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre.
(a) 24 cm (b) 27 cm (c) 26 cm (d) 25 cm

4. One card is drawn from a well-shuffled deck of 52 cards then the probability of getting a king of red colour
(a) $\frac{1}{26}$ (b) $\frac{2}{13}$ (c) $\frac{1}{13}$ (d) $\frac{3}{26}$

5. If the distance between the points (8, p) and (4, 3) is 5 then value of p is
(a) 6 (b) 0 (c) both (a) and (b) (d) none of these

6. y–axis divides the join of P(–4, 2) and Q(8, 3) in the ratio
(a) 3 : 1 (b) 1 : 3 (c) 2 : 1 (d) 1 : 2

7. Base radius of two cylinder are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is
(a) 27 : 20 (b) 25 : 24 (c) 20 : 27 (d) 15 : 20

8. A square ABCD is inscribed in a circle of radius 'r'. Find the area of the square in sq. units.
(a) $3r^2$ (b) $2r^2$ (c) $4r^2$ (d) none of these

SECTION – B

Question numbers 9 to 14 carry 2 marks each.

9. Solve the equation: $2x^2 + 3x - 90 = 0$

10. Two cones with same base radius 8 cm and height 15 cm are joined together along their bases. Find the surface area of the shape so formed.

OR

A solid metallic hemisphere of radius 8 cm is melted and recasted into a right circular cone of base radius 6 cm. Determine the height of the cone.

11. Which term of the AP 3, 8, 13, 18,…… will be 55 more than its 20^{th} term?

12. ABC is an isosceles triangle in which AB = AC, circumscribed about a circle. Show that BC is bisected at the point of contact.

13. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

14. Find the ratio in which the point (11, 15) divides the line segment joining the point (15, 5) and (9, 20).

SECTION – C

Question numbers 15 to 24 carry 3 marks each.

15. Find the value of k for which the quadratic equation $(k - 12)x^2 + 2(k - 12)x + 2 = 0$ has two real equal roots.

16. Solve the equation: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, [x \neq 0, -(a+b)]$

17. The sum of n terms of an AP is $(5n^2 - 3n)$. Find the AP and hence find its 10^{th} term.

OR

If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289 , find the sum of first n terms

18. A letter is chosen at random from the letters of the word 'ASSASSINATION'. Find the probability that the letter chosen is a (i) vowel (ii) A (iii) S

19. Prove that the parallelogram circumscribing a circle is a rhombus.

20. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

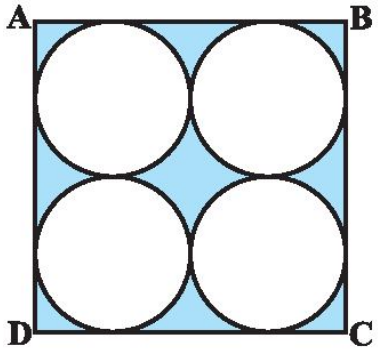
21. An ice cream cone full of ice cream having radius 5 cm and height 10 cm as shown in the below figure. Calculate the volume of ice cream, provided that its $\frac{1}{6}$ part is left unfilled with ice cream.

22. Find the value of *k* if the points A(2, 3), B(4, *k*) and C(6, –3) are collinear.

OR

Find the area of a triangle formed by the points A(5, 2), B(4, 7) and C(7, – 4).

23. Find the area of the shaded region in the below Fig., where ABCD is a square of side 14 cm.



24. A canal is 300 cm wide and 120 cm deep. The water in the canal is flowing with a speed of 20 km/h. How much area will it irrigate in 20 minutes if 8 cm of standing water is desired?

SECTION – D

Question numbers 25 to 34 carry 4 marks each.

25. The angles of elevation of the top of a tower from two points at a distance of 'a' m and 'b' m from the base of the tower and in the same straight line with it are complementary, then prove that the height of the tower is $\sqrt{a.b}$.

26. If the points (10, 5), (8, 4) and (6, 6) are the midpoints of the sides of a triangle, find its vertices.

27. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

28. In a flight for 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the original duration of flight.

OR

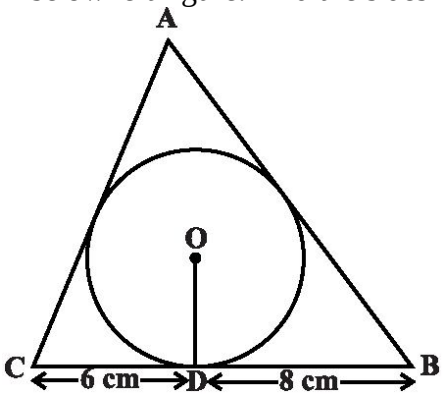
Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

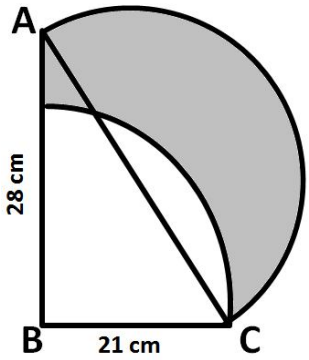
29. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

30. A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs 200 for the first day, Rs 250 for the second day, Rs 300 for the third day, etc., the penalty for each succeeding day being Rs 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?

31. A child's game has 8 triangles of which 3 are blue and rest are red, and 10 squares of which 6 are blue and rest are red. One piece is lost at random. Find the probability that it is a (i) triangle (ii) square (iii) square of blue colour (iv) triangle of red colour

32. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively as shown in below left figure. Find the sides AB and AC.





33. In the above right sided figure, ABC is a right angled triangle at B, AB = 28 cm and BC = 21 cm. With diameter a semicircle is drawn and with BC as radius a quarter circle is drawn. Find the area of the shaded region correct to two decimal places.

34. A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ of the curved surface of the whole cone. Find the ratio of the line segments into which the cone's altitude is divided by the plane.

OR

A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity and surface area of the bucket. Also, find the cost of milk which can completely fill the container, at the rate of Rs 25 per litre (use $\pi = 3.14$).

SAMPLE PAPER – II

Class – X **Max. Marks: 90**
Subject: Mathematics **Time Allowed: 3 hrs**

General Instruction:

(v) All questions are compulsory.
(vi) The question paper consists of 34 questions divided into four sections A, B. C and D.
(vii) Section A contains 8 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 10 questions of 4 marks each.
(viii) Use of calculator is not permitted.

SECTION – A

Question numbers 1 to 8 carry 1mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. If the equation $(a^2 + b^2)x^2 - 2b(a + c)x + b^2 + c^2 = 0$ has equal roots then

(a) $2b = a + c$ (b) $b^2 = ac$ (c) $b = \frac{2ac}{a+c}$ (d) $b = ac$

2. The distance of the point P(4, –3) from the origin is
(a) 1 unit (b) 7 units (c) 5 units (d) 3 units

3. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$: 1, what is the angle of elevation of the Sun? (a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

4. TP and TQ are the two tangents to a circle with center O so that angle $\angle POQ = 130^0$. Find $\angle PTQ$.
(a) 50^0 (b) 70^0 (c) 80^0 (d) none of these

5. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc
(a) 150^0 (b) 30^o (c) 60^o (d) none of these

6. To construct a triangle similar to a given ΔABC with its sides 2/5 of the corresponding sides of ΔABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. Then, locate point A1, A2, A3,A4 and A5. On BX at equal distance and next steps is to join
(a) A7 to C (b) A2 to C (c) A5 to C (d) A4 to C

7. Two dice are thrown together. Find the probability that the Sum of the numbers on the top of the dice is 12 is
(a) $\frac{1}{36}$ (b) $\frac{2}{9}$ (c) $\frac{1}{12}$ (d) none of these

8. A cylinder, a cone and a hemisphere are of the same base and of the same height. The ratio of their volumes is
(a) 1 : 2 : 3 (b) 2 : 1 : 3 (c) 3 : 1 : 2 (d) 3 : 2 : 1

SECTION – B

Question numbers 9 to 14 carry 2 marks each.

9. Solve the equation: $36x^2 - 12ax + (a^2 - b^2) = 0$

10. Find the sum of all natural numbers less than 100 which are divisible by 6.

11. XP and XQ are tangents from X to the circle with O and R is a point on the circle. Prove that XA + AR = XB + BR.

12. A solid metallic hemisphere of radius 8 cm is melted and recasted into a right circular cone of base radius 6 cm. Determine the height of the cone.

13. Two cones with same base radius 8 cm and height 15 cm are joined together along their bases. Find the surface area of the shape so formed.

14. A circle touches all the four sides of a quadrilateral ABCD with AB = 6 cm, BC = 7cm and CD = 4 cm. Find AD.

SECTION – C

Question numbers 15 to 24 carry 3 marks each.

15. Find the point on x-axis which is equidistant from (7, 6) and (–3, 4).

16. The consecutive vertices of a parallelogram ABCD are A(1, 2), B(1, 0) and C(4, 0). Find the fourth vertex D.

17. The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60°. Find the height of the tower.

18. Find the positive values of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.

19. If 10^{th} times the 10^{th} term of an AP is equal to 15 times the 15^{th} term, show that its 25^{th} term is 0.

20. ΔPQR circumscribes a circle of radius r such that angle $Q = 90^0$, PQ = 3 cm and QR = 4 cm. Find r.

21. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

22. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

23. A hemispherical tank full of water is emptied by a pipe at the rate of $\frac{25}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = \frac{22}{7}$)

24. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

SECTION – D

Question numbers 25 to 34 carry 4 marks each.

25. Find the coordinates of the circumcentre of a triangle whose vertices are A(8, 6), B(8, –2) and C(2, –2). Also, find its circumradius.

26. A two digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number.

27. A motorboat whose speed is 15 km/hr in still water, goes 30 km downstream and comes back in a total time of 4 hours 30 minutes. Find the speed of the stream.

28. If the pth, qth and rth terms of an AP is a, b, c respectively, then show that
$a(q - r) + b(r - p) + c(p - q) = 0$.

29. Prove that "The lengths of tangents drawn from an external point to a circle are equal."

30. Five cards—the ten, jack, queen, king and ace of diamonds, are removed from the well-shuffled 52 playing cards. One card is then picked up at random. Find the probability of getting (a) neither a heart nor a king (b) neither an ace nor a king

31. A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank to her field, which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3km/hr, in how much time will the tank be filled?

32. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$, find the length of the wire.

33. A right triangle, whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.

34. An aeroplane flying horizontally $1000\sqrt{3}$ m above the ground, is observed at an angle of elevation 60^0 from a point on the ground. After a flight of 10 seconds, the angle of elevation at the point of observation changes to 30^0. Find the speed of the plane in m/s.