PRE-BOARD EXAMINATION-1, DECEMBER-2019

CLASS: X   **MATHEMATICS (STANDARD)**   **Time: 3 hrs.**

Max mark: 80

General Instructions:

(i)   All the questions are compulsory.

(ii)   The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii)   Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.

(iv)   There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v)   *Use of calculators is not permitted.*

SECTION A

(Q 1- Q 10) are multiple choice questions. Select the most appropriate answer from the given options.

1.   The LCM of smallest two digit composite number and the smallest composite number is   1
     (a) 20   (b) 4   (c)   44   (d)   12

2.   Construction of cumulative frequency table is useful in determining the   1
      (a) Mean   (b) median (c)   mode   (d) mean, median, mode

3.   The decimal representation of $\frac{19}{2^3 5^2}$ will terminate after   1
     (a) One decimal places   (b)   two decimal places (c) three decimal places (d) none of these

4.   The pair of equations $x + y = 40,$ and $x - 2y = 35$ have   1
     (a) No solution (b) unique solution (c) infinitely many solutions (d) exactly two solutions

5.   If $\sin3\theta = \cos6\theta,$ then the value of θ is   1
     (a) 20^0 (b) 90^0 (c) 10^0 (d) 60^0

6.   If $\Delta ABC \sim \Delta DEF, ar(\Delta DEF) = 100cm^2$ and $\frac{AB}{DE} = \frac{1}{2}$, then $ar(\Delta ABC)$ is   1
     (a) $25cm^2$ (b) $50cm^2$ (c) $200cm^2$ (d) $150cm^2$

7.   The point which divides the line segment joining the points $(8, -9)$ and $(2, 3)$ in ratio $1 : 2$ 1
     internally lies in the
     (a) I quadrant (b) II quadrant   (c) III quadrant   (d)   IV quadrant

8. The distance of the point P (2, 3) from the origin (in units) is

    (a) $\sqrt{13}$ units (b) 5 units (c) $\sqrt{15}$ units (d) 6 units

    1

9. If A $(\frac{m}{3}, 5)$ is the mid-point of the line segment joining the points Q (– 6, 7) and

    R (– 2, 3), then the value of m is

    (a) −12   (b) −4   (c) 12   (d) −6

    1

10. The median of a given frequency distribution is found graphically with the help of

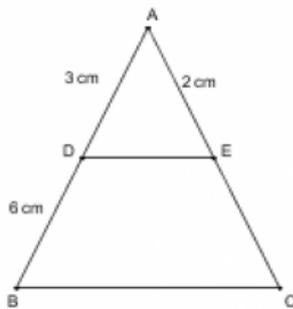   (a) histogram   (b) frequency curve   (c) ogive   (d) bargraph

    1

(Q 11- Q 15) Fill in the blanks :

11. If the volume of a cube is $343 cm^3$, then the edge of the cube is………………

    1

12. If one root of the polynomial $(k − 1)x^2 − 10x + 3$ is the reciprocal of the other, then the value
    of k is…….

    1

    OR

    A quadratic polynomial whose sum and product of zeroes are $\sqrt{2}$ and $\frac{1}{3}$ respectively is…….

13. In the figure, DE || BC. Find EC.

    1

14. Fill the two blanks in the sequence 5, _____ , 17, _____ so that the sequence forms an A.P

    1

15. A number is chosen at random from the numbers -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5. Then the
    probability that square of this number is less than or equal to 1 is…………..

    1

(Q 16- Q 20) Answer the following :

16. Check whether the pair of linear equations 2x + 4y = 3 and 12y + 6x = 6 have no solution.
    Justify your answer.

    1

17. State whether the following statement is true or false, 'If A and B are acute angles such that
    $\sin A = \sin B$, then A = B. Justify your answer.

    1

18. State whether the following statement is true or false, 'Every quadratic equation has atleast one
    real root'. Justify your answer.

    1

19. Write one rational and one irrational number lying between 0.22 and 0.32

    1

20. In the figure, PA and PB are tangents such that PA = 9cm and ∠APB = 60^0 find the length of the chord AB?   1
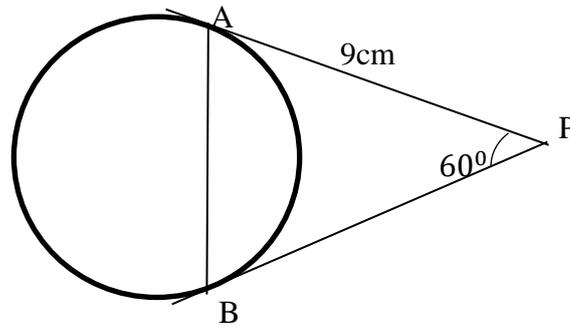
OR

The length of a tangent PQ, from an external point P is 24cm. If the distance of the point P from the centre is 25cm, then find the radius of the circle?
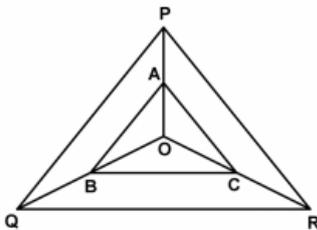
SECTION B

21.   2

The nth term of an A.P. is 6n + 2. Find the common difference.

OR

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

22.   2

In the figure, A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR.
Check whether BC || QR

23.   2

Find the mean of the following frequency distribution :

Classes :	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Frequency :	5	6	2	3	4

24. A black die and white die are thrown at the same time.   2

(i) Write the possible outcomes.

(ii) What is the probability of that the product of numbers appearing on the top of the dice is less than 9

25. Prove that the rectangle circumscribing a circle is a square.   2

26. 2 cubes each of volume 64 cm³ are joined end to end. Find the surface area of the resulting cuboid.   2

OR

The interior of a building in the form of a right circular cylinder of diameter 4.2m and height 4m is surmounted by a cone. The slant height of the cone is 2.5m. Find the outer surface area?

SECTION C

27. Obtain all the zeroes of the polynomial $x^4 + 4x^3 - 2x^2 - 20x - 15$, if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$.   3

28. Given that $\sqrt{3}$ is irrational, prove that $2\sqrt{3} - 3$ is an irrational number.   3

29. If you save Rs.1 today, Rs.2 the next day and Rs.3 the third day and so on, what will be your savings in 100 days?   3

OR

The sum of five consecutive odd integers is 685. What are the numbers?

30. Solve the following pair of linear equation: 3
$\frac{15}{x} + \frac{20}{y} = 8$; $\frac{30}{x} - \frac{7}{y} = 5$

OR

The sum of two numbers is 15. If the sum of their reciprocals is $\frac{3}{10}$, find the numbers?

31. Kiran wants to purchase a plot of land. He has the choice of buying any one of the two plots available at the same cost, as shown in the figures.   3

(i) Find the area of two plots?   (ii) Kiran decides to purchase triangular plot. Why?

A (5,2)
C(3,-5)
B (-5,-1)
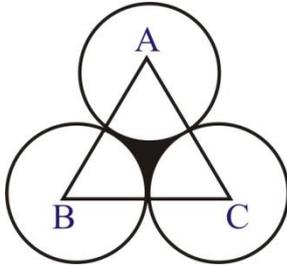
P(-1,5)
Q(2,4)
R(5,1)
S(-2,-2)
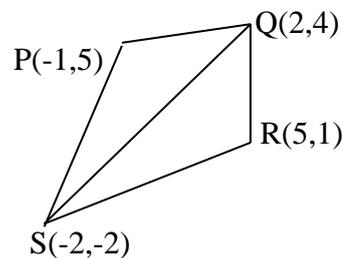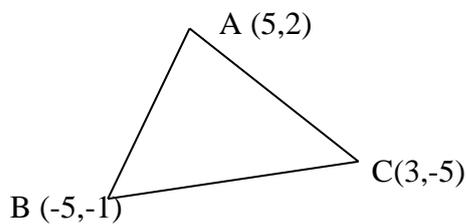
OR

If A and B are (3,5) and (-7,9) respectively, find the coordinates of P when $\frac{AB}{PB} = \frac{5}{3}$

32. Prove that $\sin^2 A + \frac{1}{1+\tan^2 A} = 1$ 3

33. If $x = a\,\text{Sin}\theta - b\,\text{Cos}\,\theta$ and $y = a\,\text{Cos}\theta + b\,\sin\theta$, prove that $x^2 + y^2 = a^2 + b^2$ 3

34.

The area of an equilateral triangle is $49\sqrt{3}\,cm^2$. Taking each angular point as centre, circles are drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. [Take $\sqrt{3} = 1.73$]   3

SECTION D

35. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.   4

OR

State and prove Pythagoras theorem.

36. A passenger train takes one hour less when its speed is increased by 15 km/hour than its usual speed for a journey of 300km. Find the usual speed of the train?   4

37. Construct a triangle with sides 5cm, 6cm, and 7cm and then another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle.   4

OR

Construct a pair of tangents to a circle of radius 3 cm which are inclined to each other at an angle of 60°

38. 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 30 per litre. Also find the cost of metal sheet used to make the container, if it costs Rs 5 per 100cm^2. (Take $\pi = 3.14$)   4

OR

A petrol tank is in the form of a frustum of a cone of height 20 m with diameters of its lower and upper ends as 20 m and 50 m respectively. Find the cost of petrol which can fill the tank completely at the rate of Rs. 70 per litre. Also find the surface area of the tank.

39. There are two poles, one each on either bank of a river just opposite to each other. One pole is 60m high. From the top of this pole, the angle of depression of the top and foot of the other pole are 30° and 60° respectively. Find the width of the river and height of the other pole?   4

40. Draw less than ogive and hence find its median.   4

Class	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Freq.	8	12	24	6	10	15	25