A

E 903

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SECOND TERM EVALUATION 2022 -'23

MATHEMATICS

Standard: IX

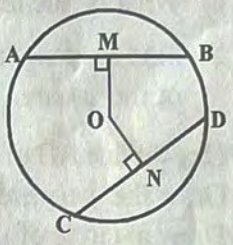
Time: 2½hours
Score : 80

Instructions

- Read the instructions before answering the questions
- Give explanations wherever necessary
- Simplifications using approximate values of $\pi, \sqrt{2}, \sqrt{3}$ need to be done only if specifically asked.
- First 15 minutes time is cool – off time

Answer any 3 Questions from 1 to 4. Each question carries 2 scores. **(3 x 2 = 6)**

1. In the figure, O is the centre of the circle.
AB and CD are two chords of the circle.
If AB = 10 centimetres and OM = ON, then

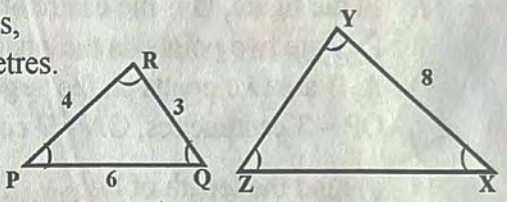


a) What is the length of CD?

b) Write the length of CN.

2. If $p(x) = x^2 + 2x + 5$, find p(1) and p(0).

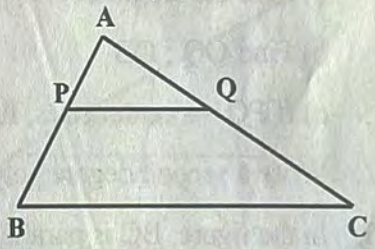
3. In the figure $\angle P = \angle X$, $\angle Q = \angle Z$.
PQ = 6 centimetres, QR = 3 centimetres,
RP = 4 centimetres and XY = 8 centimetres.



a) Find the length of YZ.

b) Find the length of ZX.

4. In the figure PQ is parallel to BC.
AP = 4 centimetres, AB = 12 centimetres,
AC = 15 centimetres,



a) Find AP : AB

b) Find the length of AQ.

Answer any 4 questions from 5 to 10. Each question carries 3 scores. **(4 x 3 = 12)**

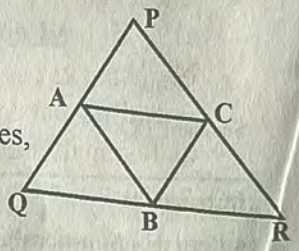
5. Draw a triangle of perimeter 12 centimetres and sides are in the ratio 3 : 3 : 5.

6. In the figure O is the centre of the circle and OP is perpendicular to CD. AB = 20 centimetres, CD = 24 centimetres, OP = 5 centimetres, then

a) CA = _____

b) Find the length of OC.

7. In the figure A, B, C are the midpoints of the sides of triangle PQR,



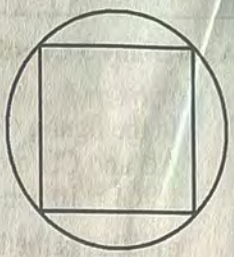
a) If AC = 4 centimetres, find QR.

b) If the perimeter of the triangle ABC is 16 centimetres, find the perimeter of the triangle PQR.

8. a) $p(x) = 4x - 5$, find $p(2)$.

b) Write a first degree polynomial $q(x)$ with $q(2)=4$ and $q(1)=0$.

9. In the figure, four vertices of a square are on a circle of diameter 1 centimetre.



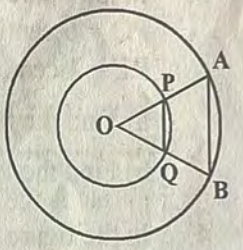
a) What is the length of the diagonal of the square?

b) Find the length of one side and the perimeter of the square.

10. Draw a line AB of length 5 centimetres.
Draw the perpendicular bisector of AB.
Draw a circle of radius 4 centimetres with AB as a chord.

Answer any 8 Questions from 11 to 21. Each question carries 4 scores. (8 x 4 = 32)

11. In the figure, O is the centre of both the circles.
P, Q are two points on the smaller circle and
A, B are two points on the larger circle.
OP = 3 centimetres, OA = 9 centimetres.



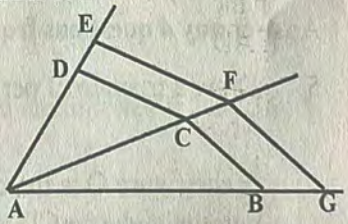
a) Find the length of PA.

b) Find OQ : QB

c) If PQ =4 centimetres, find AB.

12. Write a second degree polynomial $p(x)$ with $p(0) = 0$, $p(1) = 2$ and $p(2) = 6$.

13. In the figure, BC is parallel to GF and CD is parallel to FE and AC : CF = 3 : 1,



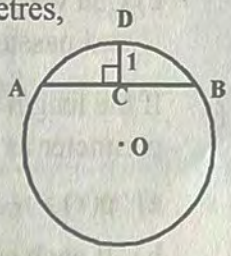
a) Find the AB : BG.

b) If AB = 15 centimetres, what is the length of BG ?

c) What is the ratio of the perimeter of the quadrilateral ABCD to that of the quadrilateral AGFE ?

14. The length of a rectangle is 2 centimetres less than 3 times its breadth.
    a) If the breadth is x centimetres, then what is its length in terms of x?
    b) Taking its perimeter as $p(x)$ centimetres, write the relation between $p(x)$ and x as an equation.
    c) Taking its area as $a(x)$ square centimetres, write the relation between $a(x)$ and x as an equation.

15. In the figure, O is the centre of the circle. AB = 10 centimetres, CD = 1 centimetre, C is the midpoint of AB. DC is perpendicular to AB.



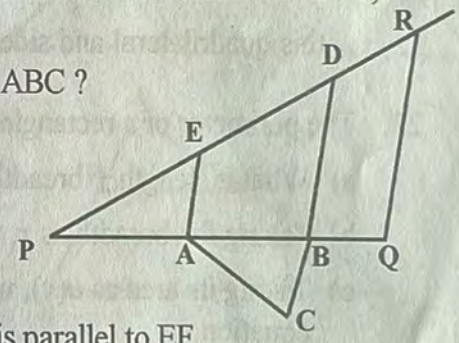
    a) Find the length of AC.
    b) If OC=x, then find the length of OD.
    c) Find the radius of the circle.

16. Draw a triangle with sides 4 centimetres, 6 centimetres and 7 centimetres. Draw its circumcircle.

17. In the figure, AB and CD are two parallel chords of the circle with centre O. AB = 48 centimetres, CD = 40 centimetres and radius of the circle is 25 centimetres.

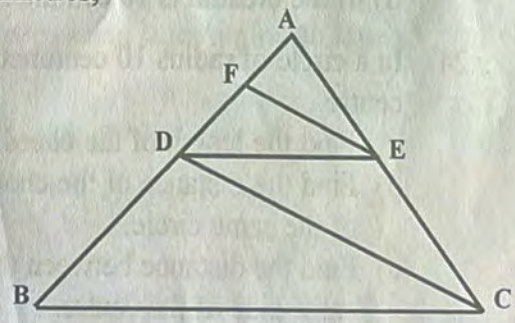
    a) Find the length of AM.
    b) Find the lengths of OM and ON.
    c) What is the distance between the chords AB and CD?

18. In the figure, AE, BD and QR are parallel lines. PE : ED : DR = 2 : 2 : 1, PA = AC and BQ = BC.



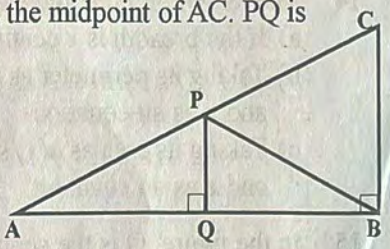
    a) What is the ratio of sides of the triangle ABC ?
    b) If BQ = 3 centimetres, find the primeter of triangle ABC.
    c) If AE = 1 centimetre, what is the length of QR ?

19. In the figure DE is parallel to BC and CD is parallel to EF. If AD = 6 centimetres and AF = 2 centimetres,



    a) FD = ...
    b) AE : EC = ...
    c) find the length of AB.

20. In the figure, ABC is a right triangle and P is the midpoint of AC. PQ is perpendicular to AB. If PQ = 3 centimetres, AB = 8 centimetres, then



a) Find the length of BC.

b) Find the lengths of AC and PB.

c) Can we draw a circle with centre at P and passing through the points A, B and C? Justify your answer.

21. If the length of one side of a square is taken as x centimetres and its perimeter as $p(x)$, then

a) $p(x) =$ _____

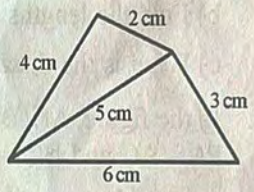
b) If each side of the square is increased by 3 centimetres, then what is the perimeter ?

c) If each side of the square is decreased by 3 centimetres, then what is the perimeter ?

d) What is the difference between the perimeters of the squares obtained by increasing and decreasing the sides by 3 centimetres?

Answer any 6 Questions from 22 to 29. Each question carries 5 scores. (6 x 5 = 30)

22. a) Draw a quadrilateral with given measures.



b) Draw a quadrilateral with angles same as this quadrilateral and sides scaled by $1\frac{1}{2}$.

23. The perimeter of a rectangle is 70 centimetres.

a) What is length + breadth ?

b) Taking the breadth as x, write the length of the rectangle in terms of x.

c) Taking its area as $a(x)$, write the relation between $a(x)$ and x as an equation.

d) If the breadth is 10 centimetres, find its area.

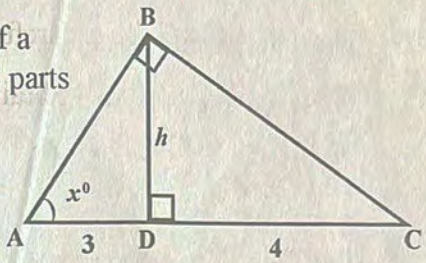
24. In a circle of radius 10 centimetres, a chord is 6 centimetres away from the centre.

a) Find the length of the chord.

b) Find the distance of the chord of length 12 centimetres from the centre of the same circle.

c) Find the distance between the chords if they are parallel and are on the same side of the centre.

25. The perpendicular from the square corner of a right triangle cuts the opposite side into two parts of 3 centimetres and 4 centimetres length.

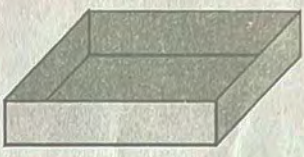


a) If $\angle A = x°$, $\angle C =$ .....

b) Find the length of BD.

c) Calculate the perpendicular sides of the large right triangle ABC.

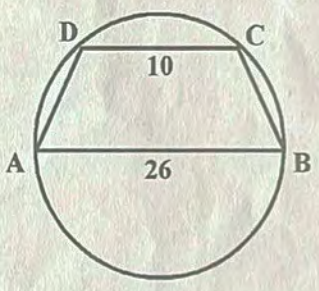
26. From the four corners of a square, small squares of same size are cut off and the sides are folded up to make a box.



a) Taking side of small square as x centimetres, write the dimensions of the box in terms of x.

b) Taking the volume of the box as $v(x)$ cubic centimetres, write the relation between $v(x)$ and x as an equation.

27. The bottom side of the quadrilateral in the figure is a diameter of the circle and the top side is a chord parallel to it.

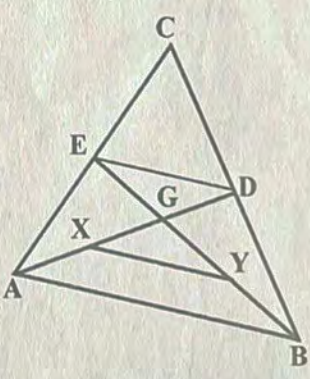


a) Find the radius of the circle.

b) Find the distance between the parallel sides.

c) Calculate the area of the quadrilateral.

28. In triangle ABC, E and D are the midpoints of AC and BC respectively. AD and BE intersect at G. X is the midpoint of AG and Y is the midpoint of BG.



a) Find AG: GD.

b) If AD = 18 centimetres, find the lengths of AG and GD.

c) If AB = 10 centimetres, find the lengths of ED and XY.

29. Read the given passage carefully and write answers to the following questions.

Observe the numbers obtained by adding the continuous odd numbers 1, 3, 5, 7, ...

$1 = 1 = 1^2$

$1 + 3 = 4 = 2^2$

$1 + 3 + 5 = 9 = 3^2$

$1 + 3 + 5 + 7 = 16 = 4^2$

.....

.....

1, 4, 9, 16,..... are square numbers.

a) Write the next line of this number pattern.

b) Which is the 10^{th} square number?

c) Write number of odd numbers less than 100. Find their sum.

d) If n^2 is a square number, which is the next square number?

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