A

Class : 9

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ANNUAL EVALUATION 2022-2023
MATHEMATICS

E903

Time : $2\frac{1}{2}$ hours

Score : 80

Instructions

- There is a 'cool off' time of 15 minutes in addition to the writing time. Use this time to get familiar with questions and plan your answers.
- Read the instructions carefully before answering the questions.
- Keep in mind, the score and time while answering the questions. Give explanations wherever necessary.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc., using approximations unless you are asked to do so.

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

1. The marks obtained by 10 students in a class test are given below. Calculate the arithmetic mean.

    40, 10, 38, 25, 22, 18, 45, 17, 33, 32

2. The base area of a prism is 50 square centimetres and its height is 20 centimetres. What is the volume of the prism?

3. Write two fractions getting closer and closer to $\frac{1}{3}$ with denominator as power of 10.

4. In right triangle ABC, AB=2 centimetres, BC=1 centimetre.

    a)   Find the length of AC.

    b)   Find the perimeter of triangle ABC.
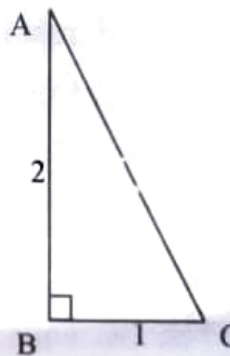
Answer any 4 Questions from 5 to 10. Each question carries 3 scores.   **(4 x 3 = 12)**

5. Draw a right triangle of perpendicular sides 8 centimetres and 6 centimetres. Draw an isosceles triangle of the same area with one side 8 centimetres.

6. P, Q, R and S are the midpoints of the sides of the quadrilateral ABCD.
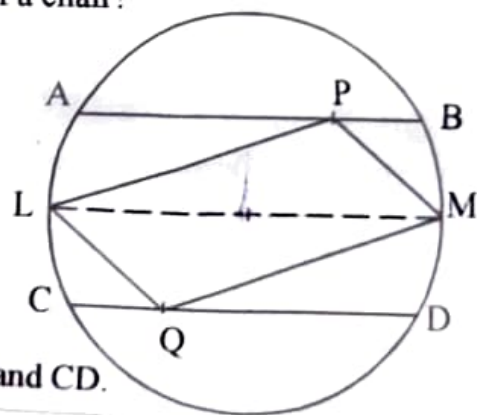 $AC = 14$ centimetres and
   $BD = 18$ centimetres.
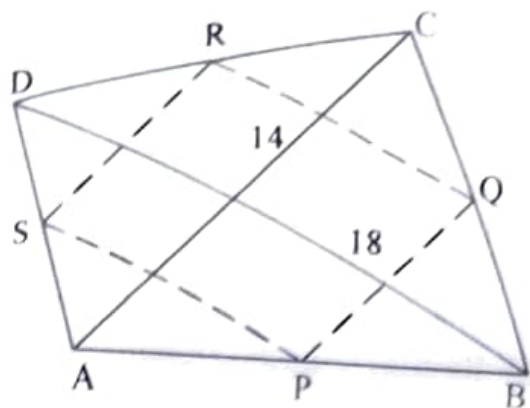
   a) Find the lengths of the sides of the quadrilateral PQRS.

   b) Among the following, what type of a quadrilateral is PQRS?
   (Rectangle, Square, Parallelogram, Rhombus)

7. The longer side of a rectangle is 2 centimetres more than its shorter side..

   a) Taking the shorter side as x and the area of the rectangle as $a(x)$, write the polynomial representing $a(x)$.

   b) Find $a(5)$.

8. a) What are the numbers on the number line at a distance of 3 units from zero?

   b) What are the numbers x, for which $|x| = 5$?

9. 30 kilograms of rice is needed for noon-meal in a school of 200 students. In another school of 300 students, 45 kilograms of rice is needed.

   a) What is the ratio of the number of students?

   b) Is the number of students and quantity of rice are in proportion? Why?

10. a) Write 5 different numbers with arithmetic mean 30.

    b) Write 6 different numbers with arithmetic mean 30.

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

11. Total cost of one table and 4 chairs is rupees 7400 and the cost of 2 tables and 6 chairs of the same rate is rupees 13600.

    What is the price of a table? What is the price of a chair?

12. AB and CD are two equal and parallel chords of a circle of diameter 16 centimetres. Diameter LM is parallel to both AB and CD. The area of triangle LPM is 48 square centimetres.

    a) What is the area of triangle LQM?

    b) Find the distance between the chords AB and CD.

13. Draw an equilateral triangle of side 5 centimetres and its circumcircle.

14. Draw a triangle of perimeter 13 centimetres and sides are in the ratio 2:3:4.

15. a) Calculate the perimeter of a wheel of radius 20 centimetres. What is the distance covered by the wheel in 10 rotations?

    b) What is the distance covered in 10 rotations by another wheel of twice the radius of the first one?

16. a) Calculate the area of a circular disc of radius 10 centimetres.

    b) It is divided into four parts by drawing two perpendicular diameters. What is the area of each of the sectors obtained?

17. a) What are the numbers x for which $|x-2| = 2$.

    b) For what value of x, $|x-2| = |x-6|$?

18. 6 square pieces of side 10 centimetres are cut out and joined as shown in the figure. It is then folded to make a prism.
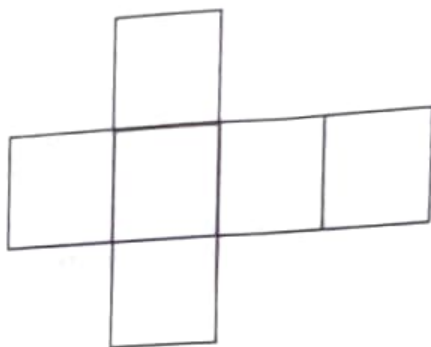
    a) Find the surface area of the prism.

    b) How many litres of water can it hold?

19. a) The lateral surface area of an equilateral triangular prism is 90 square centimetres. What is the area of one lateral face?

    b) Two such prisms are put together to form a new prism. What is the lateral surface area of the new prism?

    c) Six such prisms are put together to form a regular hexagonal prism. What is the lateral surface area of this prism?

20. Calculate the volume of a cylinder of base radius 4 centimetres and height 10 centimetres. Consider another cylinder of half the base radius and double the height of the first. What part of the volume of the first is that of the second?

21. The table below shows the length of a side and a diagonal of squares.

Side (Centimetres)	Diagonal (Centimetres)
2	$2\sqrt{2}$
3	$3\sqrt{2}$
4	$4\sqrt{2}$
5	$5\sqrt{2}$

a) If the side is 10 centimetres, then what is the length of a diagonal?

b) What is the length of the diagonal of a square of side x?

c) Is the diagonal of a square proportional to its side? If so, what is the constant of proportionality?

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

22. The table below shows the daily wages of the workers in a firm.

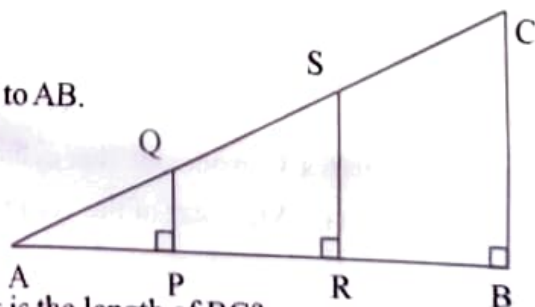Calculate the mean daily wage.

| Daily wage (in rupees)	Number of workers
450 - 550	7
550 - 650	8
650 - 750	10
750 - 850	10
850 - 950	9
950 - 1050	6

23. In the figure,

AP = PR = RB.

Also, QP, SR and BC are perpendicular to AB.

a) What is AQ : AS : AC ?

b) What is PQ : RS : BC ?

c) If PQ = 8 centimetres, then what is the length of BC?

d) How many times the sides of the triangle APQ is the sides of triangle ABC? What is the constant of proportionality?

24. Four sectors of equal size are cut off from the four corners of a rectangle of sides 6 centimetres and 4 centimetres.
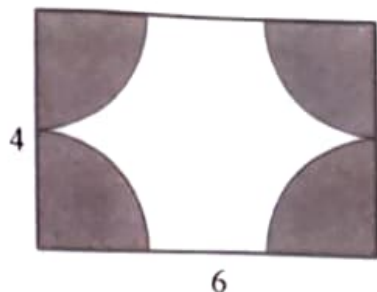
a) What is the total area of the four sectors?
b) Calculate the area of the remaining part of the rectangle?

25. A bangle is of radius 4 centimetres. $\frac{3}{4}$ of the bangle is cut and bent to make a smaller bangle.

a) What is the central angle of this piece?
b) Find the radius of the small bangle formed.
c) The remaining part is bent to make a ring. What is its radius?

26.
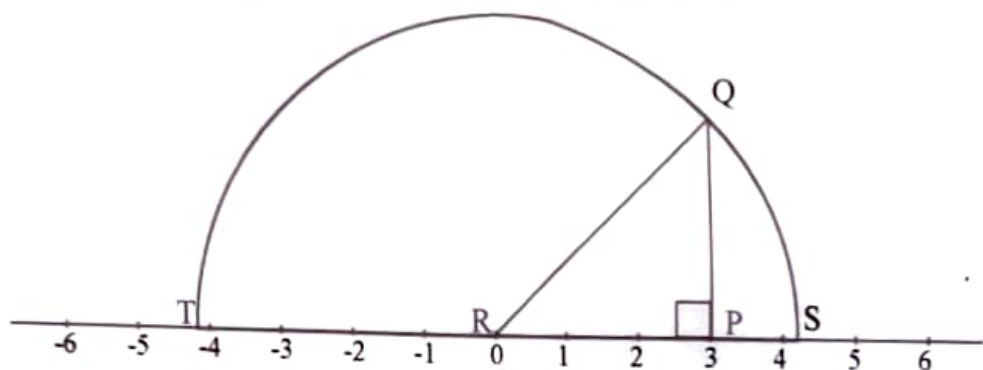
In the figure, a number line is drawn. PQR is a right triangle with PQ = PR. A semicircle is drawn with QR as radius, which cuts the number line at S and T.

a) What is the length of QR?
b) Which are the numbers representing S and T on the number line?
c) Find the distance between the points S and T on the number line. What is the number representing the midpoint of S and T?

27. When a stone is dropped into a pond, circular rings and formed. The table below shows the radius and perimeters of some of these rings formed.

radius	perimeter
10	20π
20	40π
30	60π
.....	.....

a) What is the perimeter of a circular ring of radius 50 centimetres?
b) Find the radius of the circular ring of perimeter 300 π centimetres.
c) What is the perimeter if the radius is x?
d) Is the perimeter and radius in proportion? If so, what is the constant of proportionality?

28. There are 10 cylindrical pillars of diameter 30 centimetres and height 5 metres in a school varandha. What is the total cost of painting the pillars at the rate of rupees 80 per square metre? ($\pi = 3.14$)

29. Read carefully the mathematical concept given below and answer the following questions:

You are familiar with the idea that all polygonal prisms have two equal bases and the number of lateral faces is equal to the number of sides of the base.

The following table shows the number of edges, vertices and faces of some of the polygonal prisms.

Prism	Number of sides of the base	Total number of Edges	Total number of Vertices	Total number of Faces
Triangular Prism	3	9	6	5
Rectangular Prism	4	12	8	6
Pentagonal Prism	5	15	10	7

a) What is the total number of edges of a hexagonal prism?

b) The number of sides of the base of a prism is 10. How many faces does it have?

c) Find the total number of edges and vertices of a polygonal prism of base with 'n' sides.

d) What is the number obtained when the number of edges is subtracted from the sum of the number of faces and number of vertices?