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SAMAGRA SHIKSHA KERALA
ANNUAL EVALUATION 2023-24
MATHEMATICS

E-903

Class : 9

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 $\sqrt{2}, \sqrt{3}, \pi$ etc., using approximations unless you are asked to do so.

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

1. a) Find the distance from the point 0 to 3 on the number line.
   b) Find the distance between the points -1 and 6 on the number line.

2. a) Write the decimal form of $\frac{27}{1000}$
   b) Write the fractional form of 0.39

3. The average of 16, 14, 18, x, 15 is 16, find the value of x.

4. a) Write the natural number equal to $\sqrt{3} \times \sqrt{12}$
   (3, 4, 6, 12)
   b) $\frac{\sqrt{12}}{\sqrt{3}} =$ _____
   (1, 2, 3, 4)

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

5. Draw a triangle of sides 4 centimetres, 5 centimetres and 6 centimetres. Draw a right triangle with the same area of this triangle.
6. $P(x) = x^2 + 5x - 3$
   Find $P(0), P(1), P(-1)$
7. The base edge of a square prism is 7 centimetres and its volume is 588 cubic centimetres.
   a) Find the base area of the prism.
   b) What is the height of the prism?

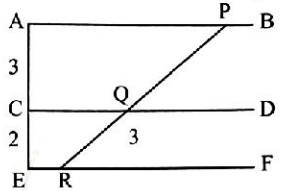
8. If 'r' is the radius and 'P' is the perimeter of a circle,
   a) Write the relation between 'P' and 'r' as an equation.
   b) Radius of a circle is 3 centimetres. Write the ratio between radius and perimeter.
   c) Write the constant of proportionality for the relationship between the perimeter and radius of a circle.

9. a) Average of 5 different numbers is calculated as 60. Find the sum of the numbers.
   b) Among those numbers, 20 is removed and 30 is added. Find the new average.

10. Draw a number line and mark $\sqrt{5}$ in this line.

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

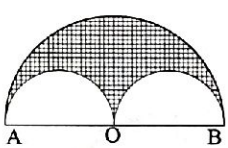
11. In the figure, the lines AB, CD, EF are parallel.
   a) AC : CE = _____
   b) QR = 3 centimetres.
      What is the length of PQ ?
   c) Draw a line of length 9 centimetres and divide it in the ratio 3 : 2



12. The sum of the perpendicular sides of a right triangle is 17 and its difference is 5
   a) Form two equations based on the given facts.
   b) Find the length of the perpendicular sides.

13. a) Write the numbers that are 6 unit away from -4 on the number line.
   b) If $|x-3|=5$, Find the values of 'x'.

14. In the figure, AB is the diameter of the semicircle with centre 'O'.
   AB = 12 centimetres.
   a) What is the radius of a small semicircle ?
   b) Find the area of a small semicircle.
   c) Calculate the area of the shaded region.



15. The base edges of a rectangular prism are 4 centimetres and 7 centimetres. Its height is 12 centimetres.
   a) Calculate the base perimeter of the prism.
   b) What is the lateral surface area of the prism ?
   c) Find the total surface area of the prism.

16. Two persons invested 6000 rupees and 9000 rupees to start a business. After one year, they got a profit of 1200 rupees and 1800 rupees respectively.

a) Write the ratio of their investments.

b) Are the profit proportional to the investments ? Why ?

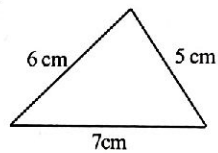
17. The table shows the quantity of milk produced in a farm during April 2023.

Milk (in Litres)	Number of Days
2	3
7	5
9	4
10	7
12	2
13	4
15	3
16	2

a) Find the total quantity of milk produced in this month.

b) Calculate the average of milk produced in the farm in a day.

18. Draw a triangle of angles same as those of the triangle shown and sides scaled by $1\frac{1}{2}$.



19. A circle is drawn with the line joining the points 3 and 11 as diameter on the number line.

a) Find the numbers denoting the centre of the circle.

b) Find the radius of the circle.

c) Find the perimeter and area of the circle.

20. The base of a prism is a regular hexagon. Its base edge is 5 centimetres and height is 13 centimetres.

a) What is the base perimeter of the prism ?

b) Find the lateral surface area of the prism.

c) This prism is divided into 6 equilateral triangular prisms. Find the lateral surface area of one such triangular prism.

21. The table shows the number of sides and one outer angle of some regular polygons.

Number of sides	One outer angle
3	$\frac{360}{3}$
5	$\frac{360}{5}$
8	$\frac{360}{8}$
10	(i) _____
n	(ii) _____

a) Complete the table.

b) By analysing the table, write the type of proportionality between number of sides and one outer angle of regular polygons.

c) What is the constant of proportionality?

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

22. The table shows the children in a class, sorted according to the score they got for a Math test.

Score	Number of children
0 – 10	5
10 – 20	7
20 – 30	3
30 – 40	6
40 – 50	7
50 – 60	4
60 – 70	5
70 – 80	3

a) Find the total number of children in the class.

b) Calculate the mean score.

23. Draw a triangle ABC with AB = 6 centimetres, $\angle A = 50^0$, $\angle B = 70^0$. Draw its circumcircle and measure the radius.

24. There are 15 cylindrical pillars in an auditorium of base diameter 40 centimetres and height 4 metres.

a) What is the base radius of a pillar ?

b) What is the curved surface area of one pillar ?

c) What would be the cost of painting 15 pillars at a rate of 100 rupees per square meter ? ($\pi = 3.14$)

25. a) The area of a triangle is 60 square centimetres and one of its side is 12 centimetres. Find the length of the perpendicular distance from the opposite vertex to the given side.

b) In triangles of area 60 square centimetres, write the relation between one side and the perpendicular distance from the opposite vertex to this side.

c) In triangles having equal area, whether one side and perpendicular distance from the opposite vertex to this side are proportional ? why ?

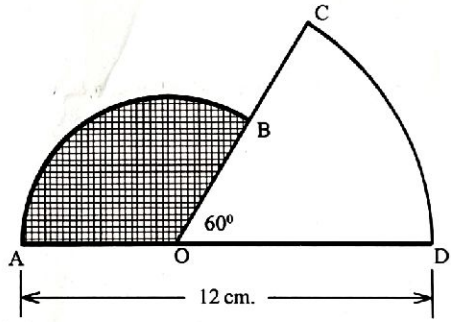
26. The base perimeter of metal cylinder is 24π and its height is 60 centimetres.

a) What is the base radius of the cylinder?

b) Find the volume of the cylinder.

c) By melting this cylinder and recasting, how many small cylinders of base radius 3 centimetres and height 15 centimetres can be made?

27. In the figure, 'O' is the centre of the two sectors. The arc length of sector OCD is 3π centimetres, AD = 12 centimetres, $\angle COD = 60^0$.



a) $\angle AOB =$ _____

b) Find the length of OD.

c) Calculate the area of the shaded sector.

28. a) $|x - 4| = |x - 6|$
What is the value of x ?

b) $|y + 1| = |y + 5|$
Find the value of y ?

c) Using the above values of x and y,
find the value of 'a' in the equation $|a - x| = |a - y|$.

29. Read and understand the mathematical pattern given below and write the answer to the following questions.

$1 = \frac{1(1+1)}{2} = 1$

$1+2 = \frac{2(2+1)}{2} = 3$

$1+2+3 = \frac{3(3+1)}{2} = 6$

$1+2+3+4 = \frac{4(4+1)}{2} = 10$

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a) Write the next line.

b) $1 + 2 + 3 + ... + n =$ _____

c) 1, 3, 6, 10, ... are triangular numbers.

Consider the sum of two consecutive triangular numbers,

$T_1 = 1 + 3 = 4 = 2^2$

$T_2 = 3 + 6 = 9 = 3^2$

$T_3 = 6 + 10 = 16 = 4^2$

$T_4 =$ _____

d) Find the sum of tenth and eleventh triangular numbers.

e) $T_{n-1} =$ _____