SAMAGRA SHIKSHA KERALA
ANNUAL EVALUATION 2021-22
MATHEMATICS

Time : $2\frac{1}{2}$ Hrs.

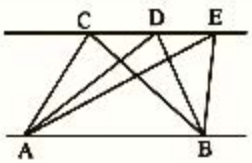
Standard: IX **Total score : 80**

Instructions

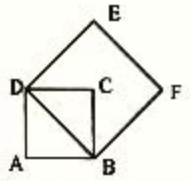
- Read the instructions before answering the questions
- Give explanations wherever necessary
- First 15 minutes time is cool – off time.
- Simplification with approximate values of $\sqrt{2}, \sqrt{3}, \pi$ etc need to be done only if specifically asked.

Answer any 3 questions from 1 to 5. Each question carries 2 scores. (3 x 2 = 6)

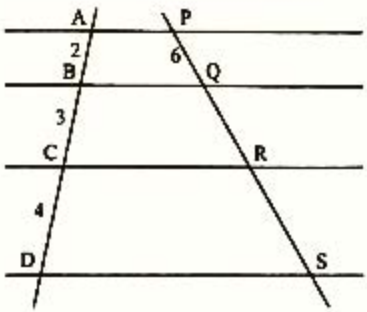
1. In the figure, AB is parallel to CE.
   Write any two triangles of equal area



2. Write the decimal form of
   (a) $\frac{1}{10}+\frac{2}{100}+\frac{3}{1000}$
   (b) Write 0.125 as the sum of reciprocals of powers of 10.
3. In the figure, side of square ABCD is 1 metre.
   (a) Find the area of square BDEF where BD is the diagonal of square ABCD.
   (b) Find BD



4. In the figure, lines AD and PS are divided by four parallel lines. AB = 2 centimetres, BC = 3 centimetres, CD = 4 centimetres, and PQ = 6 centimetres. Find QR and RS.



5. Table below shows the side of a square and its perimeter

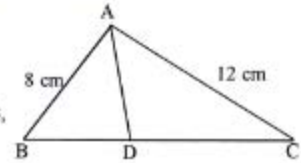
Side	Perimeter
2	8
3	12
4	16
5	20

a) Find the perimeter of a square of side a.

b) What is the constant of proportionality in the relation between side and perimeter.

Answer any 5 questions from 6 to 13. Each question carries 3 scores. (5 x 3 = 15)

6. In triangle ABC, AB = 8 centimetres, AC =12 centimetres and AD is the bisector of $\angle BAC$.



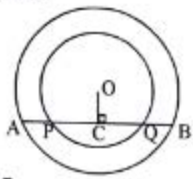
(a) Find BD : DC

(b) If the area of triangle ABD is 20 square centimetres, find area of triangle ADC

7. One side of a rectangle is 10 centimetres more than the other side.
   (a) If the smaller side is x, find the other.
   (b) Write the polynomial representing its perimeter.

8. The price of a table and a chair together is 4000 rupees. The price of a table and 3 chairs is 6000 rupees. What is the price of each?

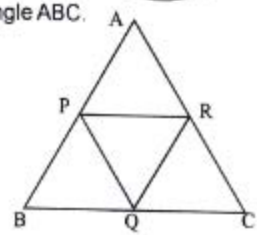
9. In the figure O is the centre of the circle and OC is perpendicular to AB.



(a) If PQ = 8 centimetres, find the length of PC

(b) Prove that AP = BQ

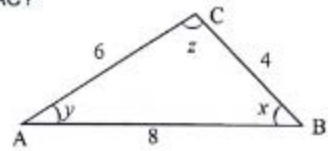
10. In the figure, P, Q, R are the mid points of the sides of triangle ABC.
   (a) If BC = 6 centimetres, find PR
   (b) If perimeter of triangle ABC is 18 centimetres, find the perimeter of triangle PQR.

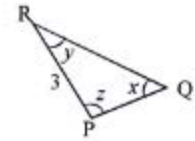


11 In the figure, angles of triangle ABC and angles of triangle PQR are equal.

(a) What times of PR is AC?

(b) Find PQ and QR.





12. Find the perimeter and area of a circle of radius 5 centimetres.

13. (a) Find the distance between the points representing 3 and 7 in the number line.

(b) Find the number representing the midpoint of 3 and 7.

Answer any 7 questions from 14 to 23. Each question carries 4 scores.

(7 x 4 = 28)

14. Two sides of a triangle are 7 centimetres and 6 centimetres and the angle between them is 60^0. Draw the triangle and its circumcircle.

15. Sum of five times of a number and two times of another number gives 20. Sum of two times of first number and six times the second number gives 34. Find the numbers.

16. (a) Find the side of a square of area 5 square centimetres.

(b) Compute the side of a square of area $\frac{1}{5}$ square centimetres correct to two decimal places. ($\sqrt{5} = 2.24$)

[Hint: $\frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{\sqrt{5} \times \sqrt{5}} = \frac{\sqrt{5}}{5}$]

17. (a) Write three fractions getting closer and closer to $\frac{1}{3}$ with denominators as powers of 10.

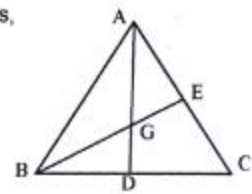
(b) Find the decimal form of $\frac{1}{3}$

18. AD and BE are the medians of triangle ABC. They intersect at G.

(a) Find AG : GD

(b) Find BG if GE = 3 centimetres.

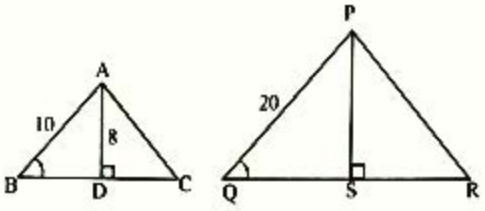
(c) If the area of triangle ABC is 60 square centimetres, find area of triangle ABD.



19. In the figure, triangle ABC and triangle PQR are similar. AB = 10 centimetres, PQ = 20 centimetres and $\angle B = \angle Q$.

(a) If AD = 8 centimetres, find PS.

(b) If the area of triangle ABC is 48 square centimetres, find the area of triangle PQR.



20. (a) Find the radius of a circular metal sheet of perimeter 12π centimetres.. Find its area.

(b) If a sector of central angle 120^0 is cut from this sheet, find its arc length.

21. (a) If $|x| = 3$, find the values of x

(b) If $|x - 1| = 3$, find the values of x

(c) If $|x - 1| = |x - 3|$, find x

22. Dimensions of a rectangular box are 50 centimetres, 30 centimetres and 40 centimetres. Find area of the cardboard required for making this box.

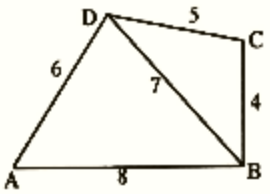
23. The daily wages of workers of a factory are given below. Find the average daily wage.

Daily wages	Number
500	3
600	7
700	10
900	8
1000	2

Answer any 5 questions from 24 to 31. Each question carries 5 scores.

(5 x 5 = 25)

24. Draw quadrilateral ABCD, with AB = 8 centimetres, BC = 4 centimetres, CD = 5 centimetres, AD = 6 centimetres and BD = 7 centimetres.



Draw a triangle of equal area to it.

25. We know,

$$\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$$

$$\sqrt{18} = \sqrt{9 \times 2} = \sqrt{9} \times \sqrt{2} = 3\sqrt{2}$$

(a) Write $\sqrt{32}$ and $\sqrt{50}$ as shown above.

(b) Find $\sqrt{50} + \sqrt{32}$

(c) Find $\sqrt{50} - \sqrt{32}$

26. In a circle of radius 5 centimetres, a chord AB is 3 centimetres away from the centre.

(a) Find the length of chord AB

(b) PQ is another chord of length 8 centimetres. Find distance of PQ from the centre

(c) Find distance between the chords AB and PQ, if they are parallel and on either side of the centre.

27. (a) Draw a line of length 13 centimetres and divide it in the ratio 2 : 3 : 4

(b) Draw a triangle of perimeter 13 centimetres and sides in the ratio 2 : 3 : 4.

28. Radii of two circles are 3 centimetres and 4 centimetres

(a) Find the ratio of their diameters

(b) Find the ratio of their perimeters

(c) Find the ratio of their areas.

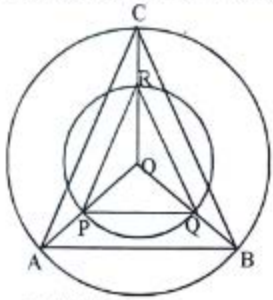
29. $p(x) = 2x^2 + 3x + 5$

(a) Find p(1) and p(0)

(b) Write a second degree polynomial with p(0) = 2 and p(1) = 5.

30. Base radius of a cylindrical water tank is 1 metre and its height is 2 metres. How many litres of water does it contain? [1 cubic metre = 1000 litres]

31. In the figure, radius of larger circle is 2 times the radius of smaller one.



(a) If PQ = 5 centimetres, find AB.

(b) Draw a triangle of sides 4 centimetres, 5 centimetres and 6 centimetres and draw another triangle with sides scaled by two.

32. **Read the given mathematical idea carefully and answer the following questions. Each question carries 1 score.** **(6 x 1 = 6)**

Consider the number pattern 2, 4, 8, 16, ...

2	$= 2^1$	$= 2$
2×2	$= 2^2$	$= 4$
$2 \times 2 \times 2$	$= 2^3$	$= 8$
$2 \times 2 \times 2 \times 2$	$= 2^4$	$= 16$

2, 4, 8, 16, 32, ... is the sequence of natural number powers of 2. Each number in this sequence is two times of its previous number. Number in the tenth position is 2^{10}. What about the number in the n^{th} position? It is 2^n. That is the general form of this sequence is 2^n.

Now consider the number sequence

3, 9, 27 .....

3	$= 3^1$	$= 3$
3×3	$= 3^2$	$= 9$

(a) $3 \times 3 \times 3 =$ ..... = ...

(b) Find the 4^{th} number in the sequence

(c) How many times of 4^{th} number is 5^{th} number?

(d) Write the 5^{th} number as power of 3.

(e) Write the 10^{th} number of this sequence as power of 3.

(f) Write the general form of this sequence.