Self Assessment Paper

2

Section 'A'

Questions 1 to 10 carry one mark each. Choose the correct answer from the alternatives given.

1. The decimal expansion of the number $\sqrt{2}$ is
   - (a) a finite decimal
   - (b) 1.41421
   - (c) non-terminating recurring
   - (d) non-terminating non-recurring

   OR

   The number 3.24636363... is
   - (a) an integer
   - (b) a rational number
   - (c) an irrational number
   - (d) None of these

2. If $x^{51} + 51$ is divided by $x + 1$, the remainder is
   - (a) 0.
   - (b) 1.
   - (c) 49.
   - (d) 50.

   OR

   If $(x + 1)$ is a factor of the polynomial $(x - 1)(2x^2 + 4x + p)$, then the value of p is
   - (a) 1
   - (b) −1
   - (c) −2
   - (d) 2

3. Point $(0, -7)$ lies
   - (a) on the x–axis.
   - (b) in the second quadrant.
   - (c) on the y-axis.
   - (d) in the fourth quadrant.

4. The graph of $y = 6$ is a line
   - (a) parallel to x-axis at distance 6 units from the origin.
   - (b) parallel to y-axis at distance 6 units from the origin.
   - (c) making an intercept 6 on the x-axis.
   - (d) making an intercept 6 on both the axes.

5. ΔABC has

   $AB = BC$, $\angle B = x°$ and $\angle A = (2x - 20)°$. *Then, the measure of $\angle B$ is*
   - (a) 30°
   - (b) 40°
   - (c) 44°
   - (d) 64°
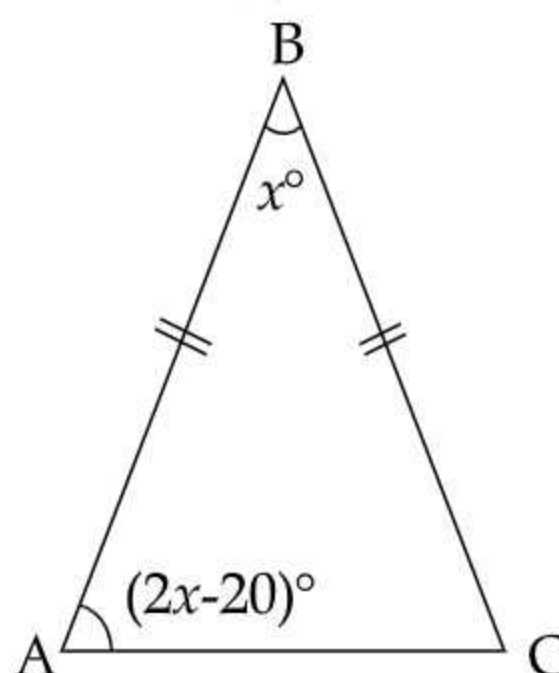
OR

If one of the angles of a triangle is 130°, then the angle between the bisectors of the other two angles can be:

(a) 50°

(b) 65°

(c) 145°

(d) 155°

6. If diagonals of a quadrilateral bisect each other at right angles, then it is a

(a) Parallelogram

(b) Rectangle

(c) Rhombus

(d) Trapezium

7. The dimensions of a cuboid are a, b, c units, its volume is V cubic units and its whole surface area is S sq. units. Then, $\frac{1}{V}$ is
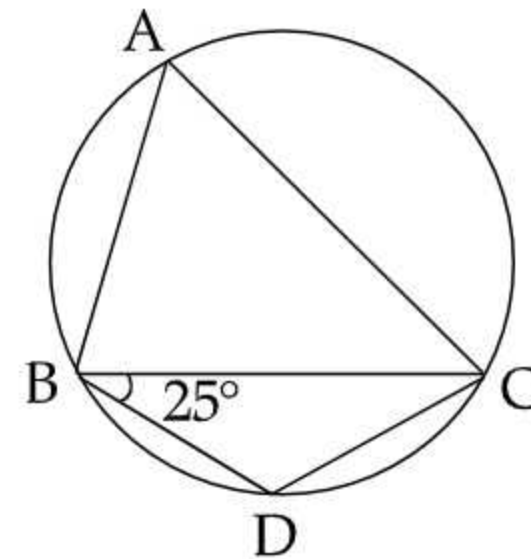
(a) $\frac{S}{2}(a+b+c)$

(b) $\frac{2}{S}\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$

(c) $2S\ (a + b + c)$

(d) $\frac{2S}{(a+b+c)}$.

8. This record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times. Then, the probability that on a given day the forecast was correct, is
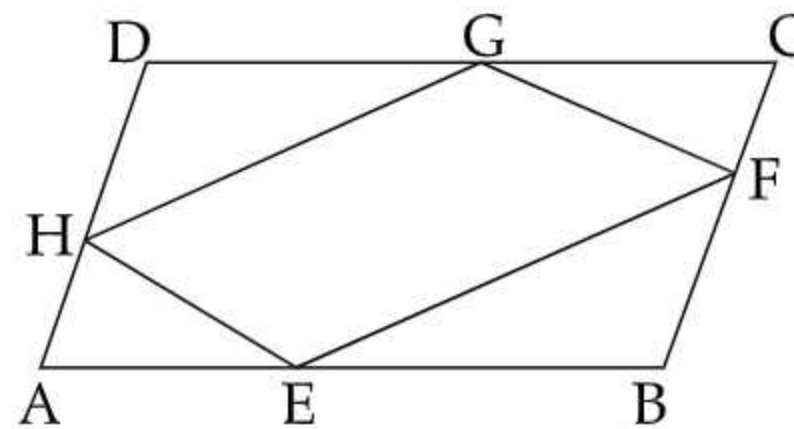
(a) 0.3

(b) 0.7

(c) 0.4

(d) 1

9. In the figure, *if BD = DC and* ∠*DBC* = 25°, then the measure of ∠*BAC* is

(a) 80°

(b) 100°

(c) 50°

(d) 110°

10. If E, F, G and H are the mid-points of sides of a parallelogram ABCD then ar (EFGH) = _____ .

(a) $\frac{1}{3}$ar(ABCD)

(b) ar (ABCD)

(c) $\frac{1}{2}$ar(ABCD)

(d) $\frac{1}{4}$ar(ABCD)

Questions 11 to 15 carry one mark each. State true or false.

11. Difference of two irrational numbers is not always irrational

OR

$2\sqrt{3}$ is a real number

12. The statements that are proved are called axioms.

13. The area of equilateral triangle with side 8 cm is $16\sqrt{3}$ cm²

OR

The sum of interior angles of a hexagon is 720°

14. The adjacent angles of a parallelogram can be both acute.

15. The median divides a triangle into two congruent triangles.

Questions 16 to 20 carry one mark each

16. Find the value of k if $x + 2$ is a factor of $2x^2 - 3kx + 2$

17. If the angles $(2x - 10)°$ and $(x - 5)°$ are complementary, find x.

[AI] 18. In quadrilateral $ABCD$, $\angle A + \angle D = 180°$. What special name can be given to this quadrilateral.

19. The perimeter of a triangle is 36 cm and its sides are in the ratio $a : b : c = 3 : 4 : 5$, then find the value of a, b, c respectively.

[AI] 20. If the height and the radius of cone is tripled, then find ratio of volume of new cone and that of original.

OR

A sphere is inscribed in a cube. Find the ratio of the volume of the cube to the volume of the sphere.
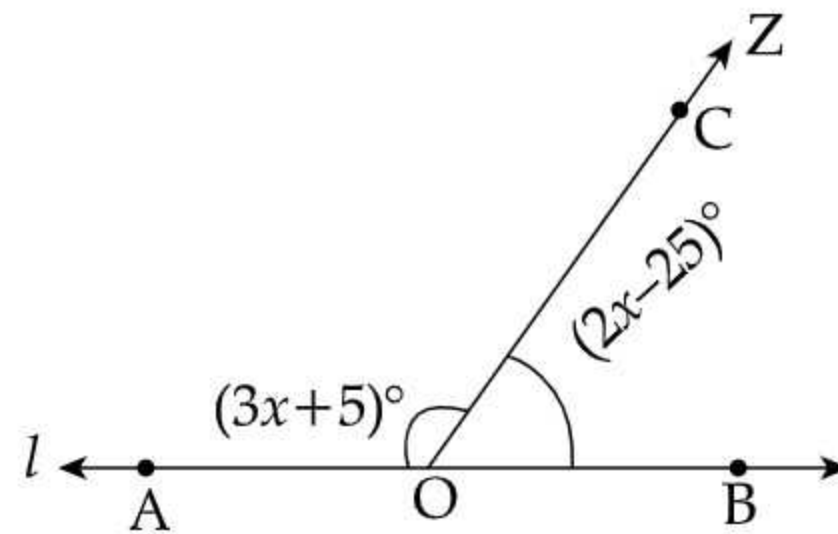
Section 'B'

Questions 21 to 26 carry 2 marks each

21. Insert three rational numbers between $-\dfrac{1}{3}$ and $-\dfrac{2}{3}$.
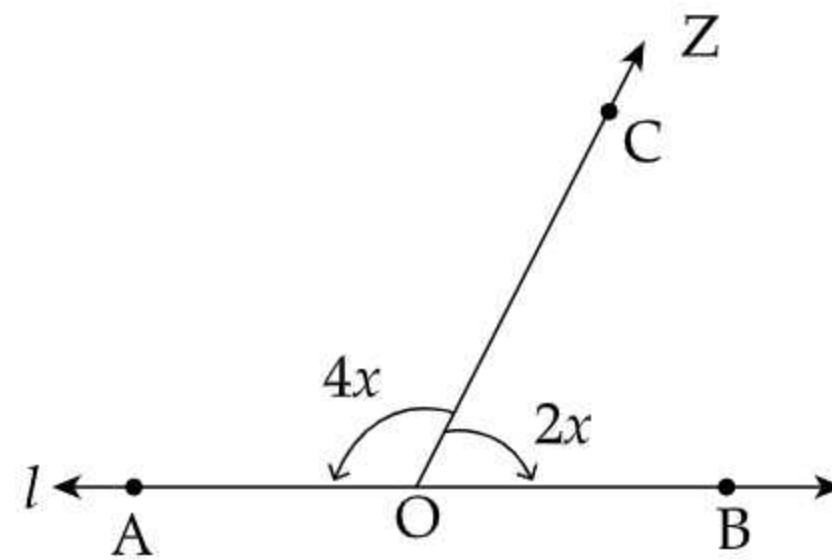
OR

Express $\dfrac{312}{125}$ in the decimal form and state whether it is terminating or not.

22. Show that of all the line segments drawn from a given point to a line, not on it, the perpendicular line segment is the shortest.

23. What value of x will make AOB a straight line ?

OR

l is a line $\angle AOC = 4x$ and $\angle BOC = 2x$. Find the value of x.

24. ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$. Show that $\angle B = \angle C$.

25. A match box measures 4 cm × 2.5 cm × 1.5 cm. What will be the volume of a packet containing 12 such boxes ?

26. Calculate mean of prime numbers lying between 6 and 20.

Questions 27 to 34 carry 3 marks each

27. Factorize : $a^9 + b^9 + 3a^6b^3 + 3a^3b^6$

28. Find the coordinates of the points where the line representing the equation $\frac{x}{4} = 1 - \frac{y}{6}$ cuts the x-axis and the y-axis.
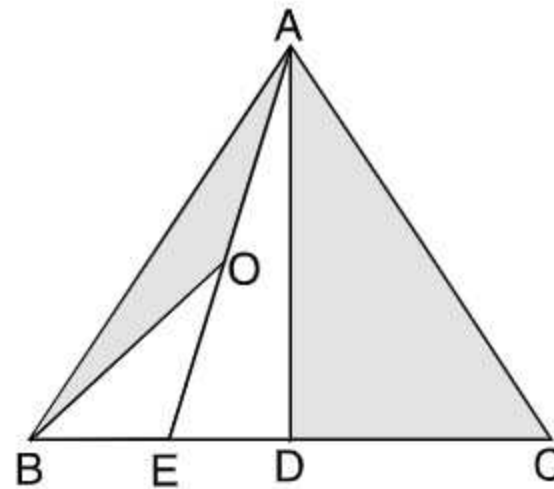
[AI] 29. Plot the following points and check whether these are collinear or not.

$$(4, -4), (3, -3), (-2, 2), (-1, 1)$$

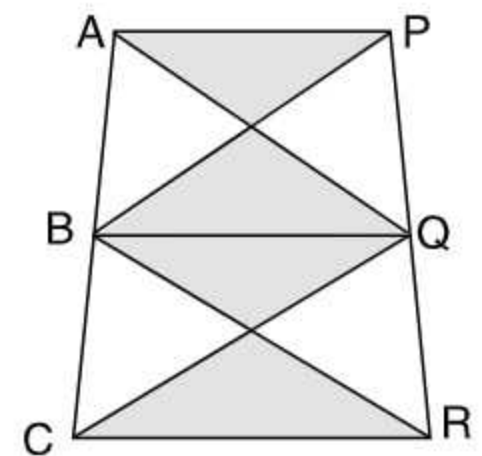Verify your answer by locating these points in cartesian plane.

[AI] 30. Show that the diagonals of a square are equal and bisect each other at right angles.

31. D is the mid-point of side BC of $\triangle ABC$ and E is the mid-point of BD. If O is the mid-point of AE, then prove that ar $(\triangle BOE) = \frac{1}{8}$ ar $(\triangle ABC)$.

OR

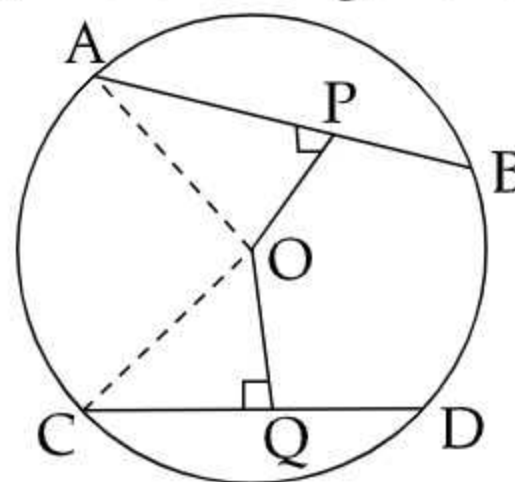In the given figure, $AP \parallel BQ \parallel CR$. Prove that ar $(AQC) = $ ar (PBR).

32. In the figure, AB and CD are two chords of a circle with centre O at a distance of 6 cm and 8 cm from O. If the radius of the circle is 10 cm, find the length of chords.

OR

Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.

33. The sides of a triangular field are 51 m, 37 m and 20 m. Find the number of rose beds that can be prepared in the field if each rose bed occupies a space of 6 sq. m.

34. Following is the data about the months of birth of 40 students in class IX :

Feb, Jan, July, June, March, Feb, Feb, Feb, Nov, Jan, Jan, Dec, May, June, June, July, June, Nov, Dec, June, July, June, Aug, Dec, June, Mar, July, July, June, Dec, Sep, Mar, Jan, Dec, June, Dec, Sep, March, Jan, Nov.

One student is chosen at random. Find the probability that the student chosen :

(i) was born in June.

(ii) was not born in the month of June.

OR

Given below is the frequency distribution of salary (in rupees) of 80 workers in a factory.

Salary (in ₹)	No. of workers
1000 - 2000	12
2000 - 3000	18
3000 - 4000	22
4000 - 5000	28

If a worker is selected at random, find the probability that his salary is

(i) Less than ₹ 3000

(ii) More than or equal to ₹ 1000

(iii) More than or equal to ₹ 2000 but less than ₹ 4000.

Section 'D'

Questions 35 to 40 carry 4 marks each

[AI]**35.** Find a and b, if $\dfrac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}} + \dfrac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}} = a + \sqrt{15}b$.

OR

If $\dfrac{9^{n+1} \times \left[3^{-n/2}\right]^{-2} - 27^{n}}{(3^{m} \times 2)^{3}} = \dfrac{1}{729}$. then, prove that $m - n = 2$.

[AI]**36.** Divide polynomial $p(x) = 2x^4 + 3x^3 - 2x^2 - 9x - 2$ by $q(x) = x^2 - 3$ and find what should be subtracted from $p(x)$ so that it is divisible by $q(x)$.

37. Solve the equation $3x + 4 = 5x + 8$ and represent the solution on (i) the number line (ii) the cartesian plane. What do you get as the representation of the solution on the cartesian plane ? In cartesian planes, how many solutions this equation have ?

[AI]**38.** Give Reasons :

(i) Construction of an angle of 22.5° is possible with the help of ruler and compass.

(ii) It is not possible to construct a ΔABC, given that $BC = 7$ cm, $\angle B = 45°$ and $AB - AC = 10$ cm.

(iii) It is possible to construct an angle of 67.5° using ruler and compass.

(iv) Construction of ΔDEF, if $EF = 5.5$ cm, $\angle E = 75°$ and $DE - DF = 2$ cm is possible.

39. A solid cylinder has total surface area 462 cm². Its curved surface area is one third of its total surface area. Find :

(i) its radius.

(ii) its height.

(iii) its volume.

OR

A closed cubical box of inner edge 20 cm is made up of wood of thickness 2 cm. Find the :

(i) Volume of the wood used to make it.

(ii) Volume of air trapped in it.

40. Draw a histogram of the weekly expenses of 125 students of a school given below :

Weekly Pocket Expenses (in ₹)	Number of Students
0 - 10	10
10 - 20	20
20 - 30	10
30 - 40	15
40 - 70	30
70 - 100	40