

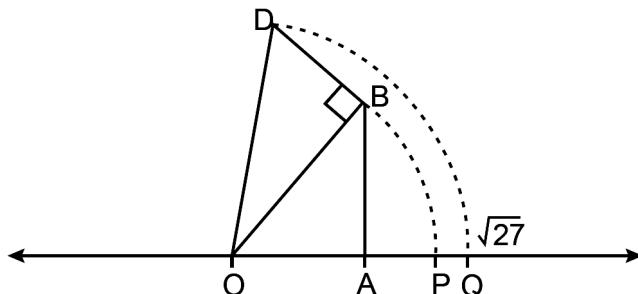
General Instruction:

1. This Question Paper has 5 Sections A-E.
2. **Section A** has 20 MCQs carrying 1 mark each.
3. **Section B** has 5 questions carrying 02 marks each.
4. **Section C** has 6 questions carrying 03 marks each.
5. **Section D** has 4 questions carrying 05 marks each.
6. **Section E** has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. Kevin's work to represent $\sqrt{27}$ on a number line is shown. In the number line, arc DQ is drawn using OD as the radius.



Looking at Kevin's work, Sonia and Rakesh made following statements.

Sonia: OA = 5 units, AB = BD = 1 unit

Rakesh: OB = 26 units and AB = 1 unit

Who is correct?

(a) Only Sonia (b) Only Rakesh (c) Both of them (d) Neither of them

2. The number 1.101001000100001... is

(a) a natural number	(b) a whole number
(c) a rational number	(d) an irrational number
3. Which of the following statements is/are correct?

(i) Every integer is a rational number.	(ii) Every rational number is an integer.
(iii) A real number is either a rational or irrational number.	(iv) Every whole number is a natural number.

 (a) (ii) (b) (iii) (c) (i) and (iii) (d) all of these
4. The value of $\left[9(64^{1/3} + 125^{1/3}) \right]^{1/4}$ is equal to

(a) 9	(b) 3	(c) 81	(d) $9\sqrt[4]{9}$
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5. If $p(x) = x + 3$, then $p(x) + p(-x)$ is equal to

(a) 3	(b) 2x	(c) 0	(d) 6
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6. Factors of $3x^2 - x - 4$ are
 (a) $(x - 1)$ and $(3x - 4)$
 (b) $(x + 1)$ and $(3x - 4)$
 (c) $(x + 1)$ and $(3x + 4)$
 (d) $(x - 1)$ and $(3x + 4)$

7. $x = 5, y = -2$ is a solution of the linear equation
 (a) $2x + y = 9$ (b) $2x - y = 12$ (c) $x + 3y = 1$ (d) $x + 3y = 0$

8. If point $(3, 0)$ lies on the graph of the equation $2x + 3y = k$, then the value of k is
 (a) 6 (b) 3 (c) 2 (d) 5

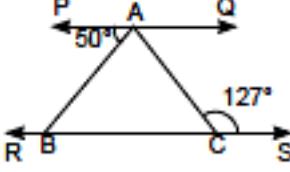
9. If we multiply or divide both sides of a linear equation with a non-zero number, then the solution of the linear equation:
 (a) changes (b) remains the same
 (c) changes in case of multiplication only (d) changes in case of division only.

10. On plotting the points $O(0, 0)$, $A(4, 0)$, $B(4, 5)$, $C(0, 5)$ and joining OA , AB , BC and CO which of the following figure is obtained ?
 (a) Square (b) Rectangle (c) Trapezium (d) Rhombus.

11. The points in which abscissa and ordinate have different signs will lie in
 (a) I and II quadrants. (b) II and III quadrants.
 (c) I and III quadrants. (d) II and IV quadrants.

12. If the difference between two complementary angles is 10° , then the angles are
 (a) $50^\circ, 60^\circ$ (b) $50^\circ, 40^\circ$ (c) $80^\circ, 10^\circ$ (d) $35^\circ, 45^\circ$

13. In the given figure, $PQ \parallel RS$ and $\angle ACS = 127^\circ$, $\angle BAC$ is

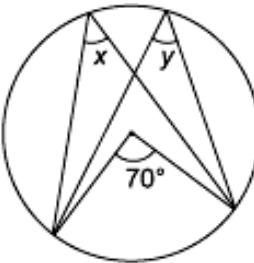


(a) 53° (b) 77° (c) 50° (d) 107°

14. If $\Delta ABC \cong \Delta PQR$ and ΔABC is not congruent to ΔRPQ , then which of the following is not true?
 (a) $BC = PQ$ (b) $AC = PR$ (c) $QR = BC$ (d) $AB = PQ$

15. A diagonal of a rectangle is inclined to one side of the rectangle at 25° . The acute angle between the diagonals is
 (a) 55° (b) 50° (c) 40° (d) 25°

16. In the given figure, value of y is



(a) 35° (b) 140° (c) $70^\circ + x$ (d) 70°

17. Given a chord AB of length 5 cm, of a circle with centre O. OL is perpendicular to chord AB and $OL = 4$ cm. OM is perpendicular to chord CD such that $OM = 4$ cm. Then CM is equal to
 (a) 4 cm (b) 5 cm (c) 2.5 cm (d) 3 cm

18. The area of an equilateral triangle is $16\sqrt{3}$ cm², then half of the perimeter of the triangle is
(a) 12 cm (b) 6 cm (c) 10 cm (d) 8 cm

DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.

19. Assertion (A): The decimal expansion of a rational number is either terminating or non-terminating recurring.

Reason (R): Every number with a non-terminating recurring decimal expansion can be expressed in the form p/q and $q \neq 0$ where p and q are integers.

20. Assertion (A): The quadrilateral formed by joining the midpoints of consecutive sides of a quadrilateral whose diagonals are perpendicular is a rectangle.

Reason (R): The line segment in a triangle joining the midpoint of any two sides of the triangle is said to be parallel to its third side and is also half of the length of the third side and the quadrilateral formed by joining the midpoints of consecutive sides of a quadrilateral is a parallelogram.

SECTION – B

Questions 21 to 25 carry 2 marks each.

21. Express $0.\overline{57}$ in the form $\frac{p}{q}$ where p and q are integers where $q \neq 0$.

OR

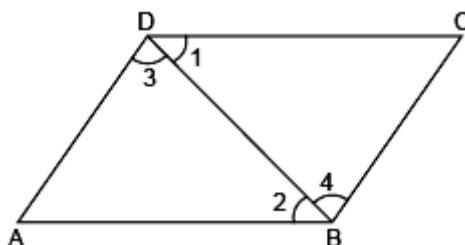
$$\text{Simplify: } \left(\frac{3125}{243}\right)^{-\frac{4}{5}}$$

22. Find the coordinates of a point:

(i) whose ordinate is 6 and lies on the y -axis
 (ii) whose abscissa is -3 and lies on the x -axis.

23. Solve the equation, $x - 10 = 25$ and state which axiom do you use here.

24. In the given figure, it is given that $\angle 1 = \angle 4$ and $\angle 3 = \angle 2$



By which Euclid's axiom, it can be shown that if $\angle 2 = \angle 4$, then $\angle 1 = \angle 3$.

25. The radius and height of a cone are in the ratio 3 : 4. If its volume is 301.44 cm^3 , what is its radius? (Use $\pi = 3.14$)

OR

Find the volume of metal used to construct a hollow metallic sphere of internal and external diameters as 10 cm and 13 cm respectively (Use $\pi = 3.14$)

SECTION – C

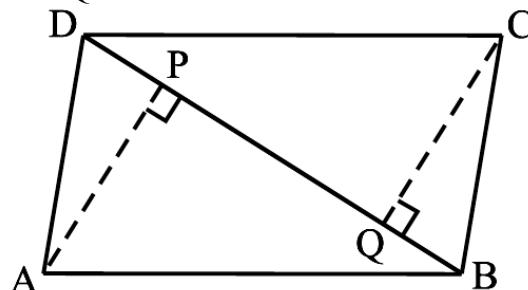
Questions 26 to 31 carry 3 marks each.

26. Simplify by rationalising the denominator:
$$\frac{4\sqrt{3} + 5\sqrt{2}}{\sqrt{48} + \sqrt{18}}$$

27. Find the value of k , if $x + k$ is factor of the polynomials:
 (i) $x^3 - (k^2 - 1)x + 3$ (ii) $-4x^3 + 4x^2 + 4kx - k$

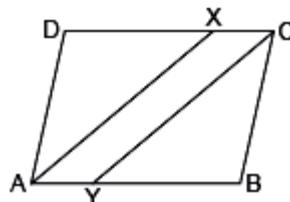
28. Show that the points A (1, 2), B (-1, -16) and C (0, -7) lie on the graph of the linear equation $y = 9x - 7$.

29. ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD (see the below). Show that
 (i) $\Delta APB \cong \Delta CQD$ (ii) $AP = CQ$



OR

In the given figure, ABCD is a parallelogram and line segments AX and CY bisect the angles A and C respectively. Show that $AX \parallel CY$.



30. The following table gives the lifetimes of 400 neon lamps:

Lifetime (in hours)	Number of lamps
300 – 400	14
400 – 500	56
500 – 600	60
600 – 700	86
700 – 800	74
800 – 900	62
900 – 1000	48

(i) Represent the given information with the help of a histogram and a frequency polygon.
 (ii) How many lamps have a lifetime of 700 or more hours?

31. The marks obtained (out of 100) by a class of 80 students are given below:

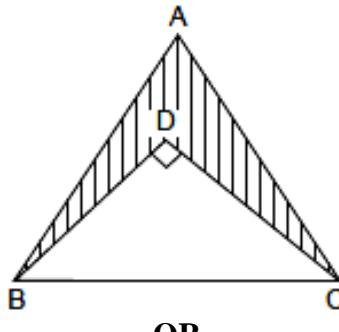
Marks	10 – 20	20 – 30	30 – 50	50 – 70	70 – 100
Number of students	6	17	15	16	26

Construct a histogram to represent the data above.

SECTION – D

Questions 32 to 35 carry 5 marks each.

32. In the given figure, ΔABC is an equilateral triangle with side 10 cm and ΔDBC is right angled triangle with $\angle D = 90^\circ$. If $BD = 6$ cm, then find the area of the shaded portion. (Use $\sqrt{3} = 1.732$)



OR

A gardener has to put double fence all around a triangular field with sides 120 m, 80 m and 60 m. In the middle of each of the sides, there is a gate of width 10 m.

- (i) Find the length of wire needed for fencing.
- (ii) Find the cost of fencing at the rate of ₹ 6 per metre.
- (iii) Find the area of triangular field.

33. Find the value of a and b so that polynomial $p(x) = x^3 - 3x^2 - ax + b$ has $(x + 1)$ and $(x - 5)$ as factors.

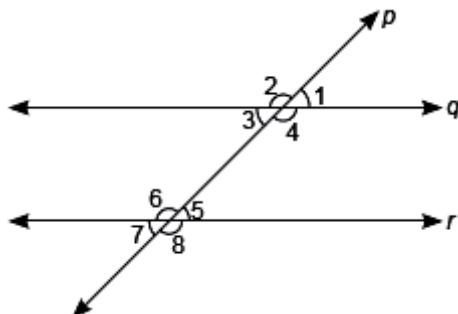
OR

- (a) Prove that: $(x - y)^3 + (y - z)^3 + (z - x)^3 = 3(x - y)(y - z)(z - x)$
- (b) Factorise: $x^3 + 3x^2y + 3xy^2 + y^3 - 125$

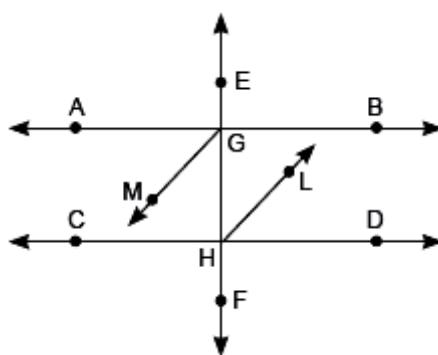
34. A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m

- (i) How many students can sit in the tent if a student, on an average, occupies $5/7 \text{ m}^2$ on the ground?
- (ii) Find the volume of the cone.

35. (a) In the given figure, p is transversal to q and r . Given $q \parallel r$ and $\angle 1 = 75^\circ$. Find $\angle 6$ and $\angle 7$.



(b) In the given figure, bisector GM and HL of alternate angles AGH and DHG respectively are parallel to each other. Prove that $AB \parallel CD$.



SECTION – E(Case Study Based Questions)

Questions 36 to 38 carry 4 marks each.

36. Case Study – 1:

Christmas is celebrated on 25 December every year to remember the birth of Jesus Christ, who Christians believe is the son of God. Santa Claus, also known as the Father of Christmas, is a

legendary character originating in western Christian culture and he brings gifts for everyone on Christmas. Let Santa Claus brings 3 chocolates for each child and 2 chocolates for each adult present at the Christmas party at Michael's home along with a Christmas cake. He distributes total 90 chocolates among all.



- (a) How to represent the above situation in a linear equation in two variables by taking the number of children as x and the number of adults as y ? If the number of children is 10, then find the number of adults at the Christmas party. (2)
- (b) Find the value of k , if $x = 5, y = 1$ is a solution of the equation $5x + 7y = k$. (1)
- (c) Write the standard form of the linear equation $y - x = 7$. (1)

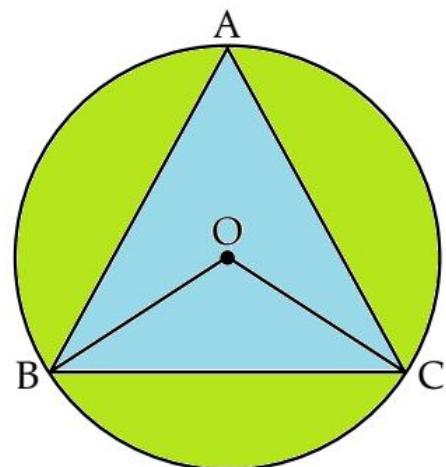
37. Case Study – 2:

One triangular shaped pond is there in a park marked by ABC. Three friends are sitting positions at A, B and C. They are studying in Class IX in an International. A, B and C are equidistant from each other as shown in figure given below.

- (i) What is the value of $\angle BAC$? (1)
- (ii) What will be the value of $\angle BOC$? (2)

OR

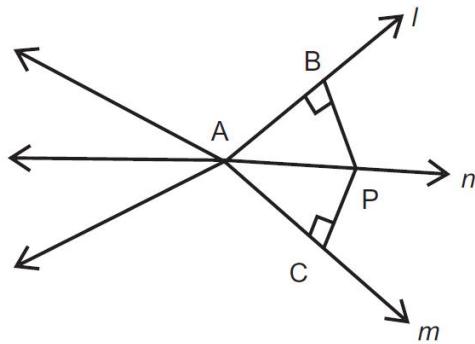
- (ii) What will be the value of $\angle OBC$? (2)
- (iii) Which angle will be equal to $\angle OBC$?



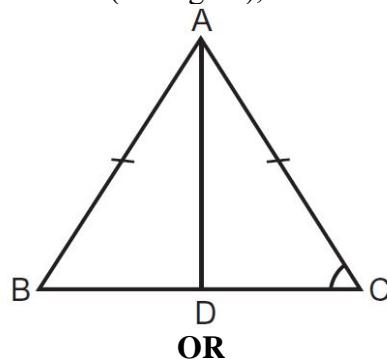
38. Case Study – 3:

To check the understanding of the students of the class about IX the triangles, the Mathematics teacher write some questions on the blackboard and ask the students to read them carefully and answer the following question.

(a) In figure, P is a point equidistant from the lines l and m intersecting at point A, Prove that $\angle BAP = \angle CAP$

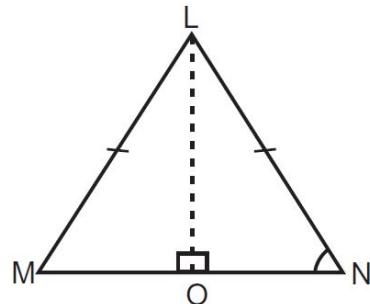


(b) In $\triangle ABC$, if $AB = AC$ and $BD = DC$ (see figure), then find $\angle ADC$.



OR

(b) $\triangle LMN$ is an isosceles triangle, where $LM = LN$ and LO , is an angle bisector of $\angle MLN$, Prove that point 'O' is the mid-point of side MN .



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