Diksha Bala

St. Paul's School
Class IX – Half Yearly Examination (2024-25)
Mathematics

Time: 3 Hr **M.M: 80**

General instructions:

(i) This question paper has 5 Sections A - E.
(ii) Section A has 20 MCQs carrying 1 mark each.
(iii) Section B has 5 questions carrying 02 marks each.
(iv) Section C has 6 questions carrying 03 marks each.
(v) Section D has 4 questions carrying 05 marks each.
(vi) Section E has 3 case based question carrying 04 marks.
(vii) All questions are compulsory.

SECTION A **20 X 1**

1. Which of the following is not a polynomial?
   a) $5x - 4y + 3 + 78zx$
   b) $2x + 2^{414}z^4 + 16^{(-2)}$
   c) $24x^{-5} + x^2$
   d) 0

2. The mirror image of a point Q (–3, –2) with respect to the x- axis is
   a) (3, 2)
   b) (3, -2)
   c) (-3, 2)
   d) (-3, -2)

3. The simplest rationalizing factor of $\sqrt[8]{x^5y^3z^4}$ is
   a) $\sqrt[8]{x^5y^3z^3}$
   b) $\sqrt[8]{x^3y^5z^4}$
   c) $x^3y^5z^4$
   d) $x^5y^3z^4$

4. The distance of a point G (-3.-4) from the origin is
   a) 2 units
   b) 3 units
   c) 5 units
   d) 4 units

5. The degree of a constant polynomial is:
   a) 0
   b) any natural number
   c) 1
   d) not defined

6. The value of n for which $\sqrt{n}$ can be a rational number is
   a) 8
   b) 6
   c) 49
   d) π

7. The linear equation 3y- 5 = 0 represented as ax + by+ c = 0 has
   a) a unique solution
   b) infinitely many solutions
   c) two solutions
   d) no solution

8. The equation of the y-axis is of the form:
   a) $x = 0$
   b) $y = 0$
   c) $x = y$
   d) $x + y = 0$

9. The abscissa of all the points on x axis is
   a) 0
   b) 1
   c) 2
   d) any number

10. Double of same things are
   a) equal
   b) unequal
   c) halves of the same things
   d) double of the same things.

11. Given two right angled triangles ABC and PRQ, such that $\angle A = 30°$, $\angle Q = 30°$ and AC=QP, then
   a) $\Delta ABC \cong \Delta PQR$
   b) $\Delta ABC \cong \Delta PRQ$
   c) $\Delta ABC \cong \Delta QRP$
   d) $\Delta ABC \cong \Delta RPQ$

12. The graph of the linear equation $3x + 5y = 15$ cuts the x-axis at the point
   a) (5,0)
   b) (3,0)
   c) (0,5)
   d) (0,3)

13. Line l is perpendicular to the line m and line m is perpendicular to line n, the line l is……to the line n.
   a) parallel
   b) perpendicular
   c) intersecting
   d) none of these

14. If $p(x) = x^2 - 2\sqrt{2}x + 1$ then $p(2\sqrt{2})$ is
   a) 0
   b) 1
   c) $4\sqrt{2}$
   d) $8\sqrt{2} + 1$

15. If the difference between two complementary angles is 10, then the angles are
   a) $50^0, 60^0$
   b) $50^0, 40^0$
   c) $80^0, 10^0$
   d) $35^0, 45^0$

16. The number of dimensions a solid has
   a) 3
   b) 1
   c) 5
   d) 2

17. Axioms are assumed
   a) universal truth in all the branches of mathematics
   b) universal truth specific to geometry
   c) theorem
   d) definition

18. The angles of a triangle are in the ratio of 2:4:3. The smallest angles of triangle is
   a) 20°
   b) 60°
   c) 80°
   d) 40°

19. **Assertion (A):** The zeroes of the polynomial $f(x) = x^2 - 5x + 6$ are 3 and 2.
Reason (R): 'A linear polynomial has exactly one zero'.
a) A is true, R is true; R is the correct explanation of A.
b) A is true, R is true; R is not the correct explanation of A.
c) A is true, R is false.
d) A is false, R is true.

20. **Assertion (A):** There are infinite number of lines passing through (2,5).
Reason (R): A linear equation in two variables has unique solution.
a) A is true, R is true; R is the correct explanation of A.
b) A is true, R is true; R is not the correct explanation of A.
c) A is true, R is false.
d) A is false, R is true.

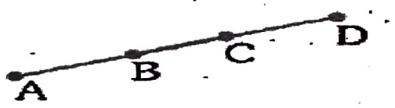
SECTION B 5 X 2

21. Express 0.404040…in p/q form, where p and q are co-prime integers and $q \neq 0$.
22. Check whether the graph of the linear equation $2x + y = 6$ passing through the origin.

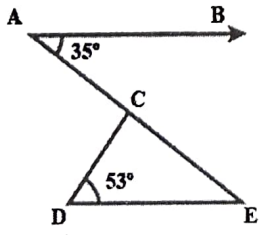
OR

For what value of p, the point (p,2) lies on the line $3x + y = 11$?

23. In which quadrant/axis, will a point lie, if
a) The ordinate is 2 and the abscissa is -3
b) The ordinate is 3 and the abscissa is 0
24. In fig, if AC=BD, then prove that AB = AC



25. In fig, if AB‖ BC, $\angle BAC = 35^0$ and $\angle CDE = 50^0$, find $\angle DCE$.



SECTION C 6 ×3

26. Represent $\sqrt{5}$ on a number line.

27. Factorise the polynomial $p(x) = x^3 + 2x^2 - 5x - 6$ using factor theorem

28. If y is expressed in terms of x as $4y = 5x - 3$. Also find x, when $y = 3$.

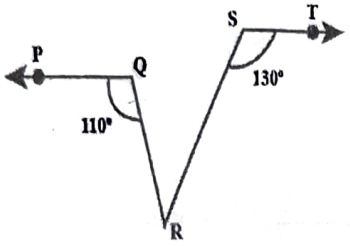
OR

Find any three solutions of the line $4x + 3y = 12$

29. Plot the points P (1,0), Q (4,0) and S (1,3). Find the coordinates of the point R such that PQRS is a square.

30. If a point C lies between two points A and B such that AC = BC, then prove that $AC = \frac{1}{2} AB$. Explain by drawing the figure.

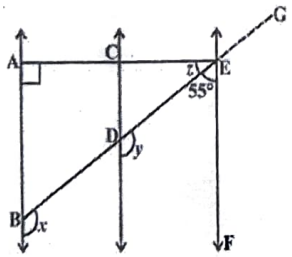
31. In fig PQ‖ ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$, find $\angle QRS$.



SECTION D **4 X 5**

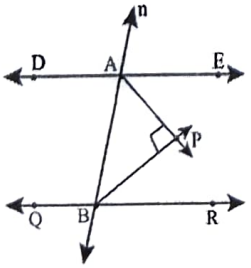
32. If $\frac{5+\sqrt{11}}{3-2\sqrt{11}} = x + y\sqrt{11}$, find the value of x and y.

33. In Fig, AB‖ CD and CD‖ EF . Also, EA‖ AB. If $\angle BEF = 55^0$, find the value of x, y, z.



OR

In Fig, DE ‖QR and AP and BQ are bisector of $\angle EAB$ and $\angle RBA$ respectively. Find $\angle APB$.



34. a) Find the value of $x^2 + \frac{1}{x^2}$, if $x - \frac{1}{x} = \sqrt{3}$.

b) Factorise: $2x^5 + 432\,x^2y^3$

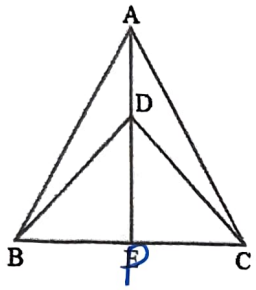
35. In ΔABC and ΔDBC are two isosceles triangles on the same base BC and the vertices A and D are on the same base BC. If AD is extended to intersect BC at P. Show that

(a) $\Delta ABD \cong \Delta ACD$

(b) $\Delta ABP \cong \Delta ACP$

(c) AP bisect $\angle$ A as well as $\angle$ D.

(d) AP is the perpendicular bisector of BC.



SECTION E **3 X 4**

36. For a group activity of class IX A, the teacher divided the space as Cartesian plane and chairs are placed at various points for the group of 4 students at points A, B, C and D.

(a) What is common in points A and D?

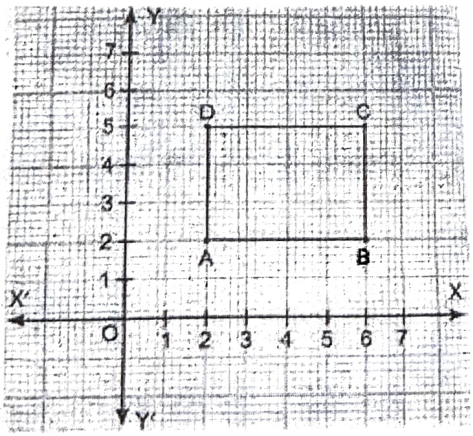
(b) What is common in pints A and B

(c) Find the area of rectangle ABCD?

(d) Write the coordinate of point C.

OR

What is the distance of point A to B?



37. On his birthday, Manoj planned that this time he spent his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each child and 3 apples to each adult working there along with Birthday cake. He distributed 60 total apples.

Based on the above situation, answer the following questions:

(a) Write a linear equation in two variables for the above situation in standard form.

(b) If the number of children is 18, then find the number of adults.

(c) If the number of adults is 12, then find the number of children.

(d) Find the value of b if $x = 5, y = 0$ is a solution of the equation $3x + 5y = b$.

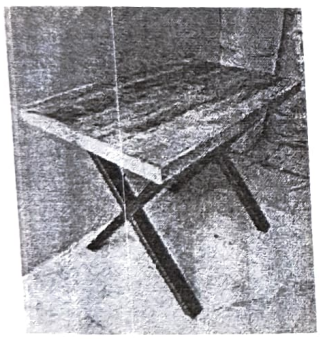
OR

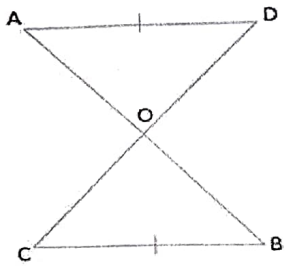
(e) What is the standard form of the linear equations in two variables $y - x = 5$?

6

38. In a 5-star hotel, there is a table to keep a big flower vase, whose legs are in X position. As shown in the figure CB is the cross position of the top of the table. AB and DC are the two legs of the table intersecting each other at O. AD is the support fitted to the two leg at A and D to give table the required stability. That table is so made that AD|| CB and BC = AD.

Based on the given information and the figure above answer the following questions:





(a) Why is ∠ CBO = ∠ DAO

(b) By which property Δ BOC and Δ AOD are congruent?

(c) What will you get from the congruency of Δ BOC and Δ AOD

(d) In what ratio does O divide both AB and CD?