ST. JOHN'S HIGH SCHOOL
CLASS IX
MATHEMATICS
HALF YEARLY EXAMINATION 2024

DURATION: 3 Hrs. **M M: 80**

General Instructions:

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).

SECTION A

1. Given a rational number $\frac{-5}{9}$. This rational number can also be known as

(a) a natural number (b) a whole number (c) a fraction (d) a real number

2. The degree of polynomial p(x) = x + $\sqrt{(x^2 + 2x + 1)}$ is

(a) 2 (b) 1 (c) 0 (d) 3

3. The square root of which number is rational

(a) 7 (b) 0.006 (c) 0.04 (d) 13

4. If the x-coordinate of a point is zero, then this point lies:

(a) In II quadrant (b) In I quadrant (c) On x-axis (d) On y-axis

5. A linear equation in two variables is of the form $ax + by + c = 0$, where

(a) $a \neq 0, b \neq 0$ (b) $a = 0, b \neq 0$ (c) $a \neq 0, b = 0$ (d) $a = 0, c = 0$

6. The value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$, is

(a) 1 (b) 2 (c) –3 (d) 3

7. What is the area of an equilateral triangle with side 2 cm?

(a) $\sqrt{6}cm^2$ (b) $\sqrt{3}cm^2$ (c) $\sqrt{8}cm^2$ (d) $4cm^2$

8. If $x + y = 3, x^2 + y^2 = 5$ then xy is

(a) 1 (b) 3 (c) 2 (d) 5

9. On dividing $6\sqrt{27}$ by $2\sqrt{3}$, we get

(a) $3\sqrt{9}$ (b) 6 (c) 9 (d) none of these

10. The zero of the polynomial $p(x) = 2x + 5$ is

(a) 2 (b) 5 (c) $\frac{2}{5}$ (d) $-\frac{5}{2}$

11. Through which of the following points, the graph of $y = -x$ passes?

(a) (1, 1) (b) (0, 1) (c) (–1, 1) (d) (2,2)

12. The section formed by horizontal and vertical lines determining the position of point in a cartesian plane is called:

(a) Origin (b) X-axis (c) Y-axis (d) Quadrants

13. How many linear equations are satisfied by $x = 2$ and $y = -3$?

(a) Only one (b) Two (c) Three (d) infinitely many

14. If two complementary angles are in the ratio 13: 5, then the angles are:

(a) $13x°$, $5x°$ (b) 25° , 65° (c) 65° , 25° (d) 65° , 35°

15. If ΔABC is congruent to ΔDEF by SSS congruence rule, then:

(a) $\angle C < \angle F$ (b) $\angle B < \angle E$ (c) $\angle A = \angle D$ only (d) $\angle A = \angle D, \angle B = \angle E, \angle C = \angle F$

16. What is the angle formed by a line?

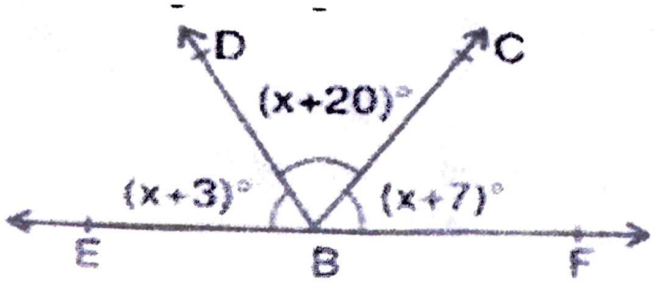
(a) 90° (b) 180° (c) 270° (d) 360°

17. In two triangles ABC and DEF, AB = DE, BC = DF and AC = EF, then

(a) $\Delta ABC \cong \Delta DEF$ (b) $\Delta ABC \cong \Delta EDF$ (c) $\Delta ABC \cong \Delta FDE$ (d) none of these

18. In the given figure, find the value of x:

(a) 40° (b) 50° (c) 60° (d) 80°



NOTE: In question number 19 and 20, a statement of ASSERTION(A) is followed by a statement of REASON(R). Choose the correct option.

19. Assertion (A): The point (-2, 0) lies on y -axis and (0, 4) on x –axis.

Reason(R): Every point on the x -axis has zero distance from x -axis and every point on the y -axis has zero distance from y -axis.

(a) Both A and R are true, and R is the correct explanation of the assertion.

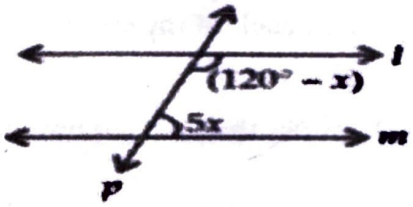
(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

20. Assertion (A): The value of x from the adjoining figure, if l || m is 15°

Reason(R): If two parallel lines are intersected by a transversal, then each pair of corresponding angles so formed is equal.



(a) Both A and R are true, and R is the correct explanation of the assertion.

(b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.

(d) A is false, but R is true.

SECTION B

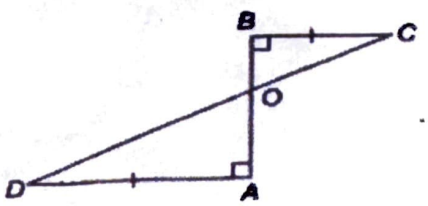
21. Check which of the following are solutions of the equation x – 2y = 4.

(a) (0, 2)

(b) (4, 0)

22. AD and BC are equal perpendiculars to a line segment AB (see figure).

Show that CD bisects AB.



23. Find the value of $\sqrt{(3)^{-2}}$

24. Find the value of $249^2 - 248^2$.

25. Without plotting the points indicate the quadrant in which they will lie, if
(i) ordinate is 5 and abscissa is – 3
(ii) abscissa is – 5 and ordinate is – 3
(iii) abscissa is – 5 and ordinate is 3
(iv) ordinate is 5 and abscissa is 3

SECTION C

26. Express the following linear equations in the standard form and indicate the values of a, b and c in each case:
(a) $5 = 2x$
(b) $-2x + 3y = 6$

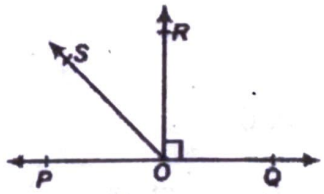
27. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

28. Find three different irrational numbers between the rational numbers $\frac{2}{7}$ and $\frac{5}{9}$

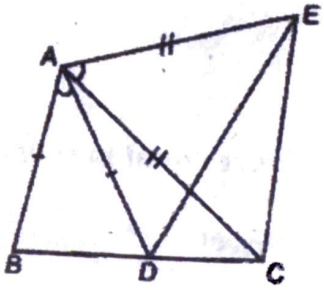
29. Find the values of a and b so that $(2x^3 + ax^2 + x + b)$ has $(x + 2)$ and $(2x - 1)$ as factors.

30. In figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$



31. In the given figure, AC = AE, AB = AD and $\angle BAD = \angle EAC$. Show that BC = DE.

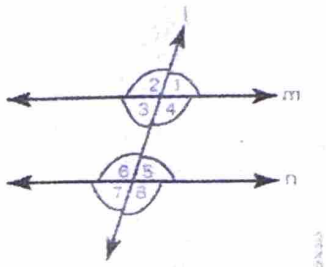


SECTION D

32. (a) If two lines intersect, prove that the vertically opposite angles are equal.

(b) In figure, $\angle 1 = 60°$ and $\angle 6 = 120°$.

Show that lines m and n are parallel.

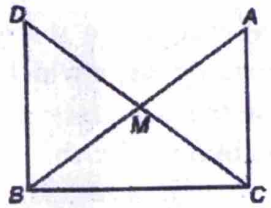


33. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see figure). Show that

(i) $\Delta AMC \cong \Delta BMD$

(ii) $\angle DBC$ is a right angle

(iii) $\Delta DBC \cong \Delta ACB$



34. (a) Express 23.434343..... in p/q form, where p, q are integers and $q \neq 0$.

(b) Evaluate: $(\sqrt{5} + \sqrt{2})^2 + (\sqrt{8} - \sqrt{5})^2$

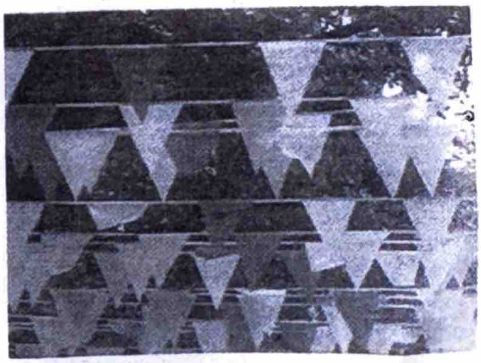
35. (a) Find the zeroes of the polynomial : $p(x) = (x-2)^2 - (x+2)^2$

(b) Factorise : $a^3 - 8b^3 - 64c^3 - 24abc$

SECTION E

(Case Study Based Questions)

36. A craft mela is organized by Welfare Association to promote the art and culture for tribal people. Fairs and festivals are the custodians of our great cultural heritage. The pandal is to be decorated by using triangular flags around the field. Each flag has dimensions 25 cm, 25 cm and 22 cm.

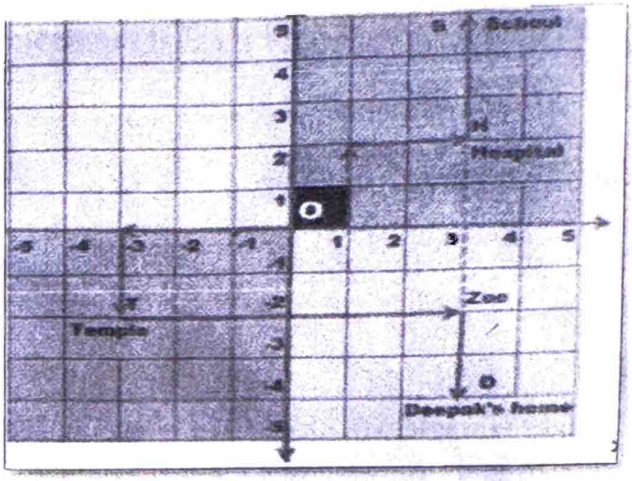


(a) What is the semi-perimeter of the flag?

(b) What is the area of the flag? (Use $\sqrt{14} = 3.74$ approx.)

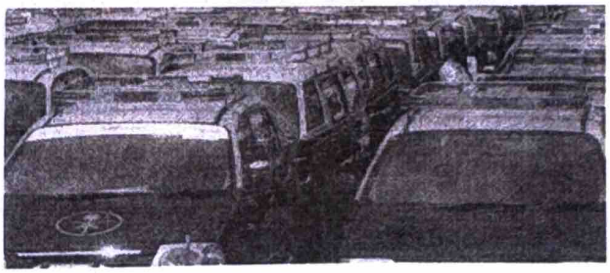
(c) If the rate of the cloth is ₹ 200 per m^2, find the total cost of 300 flags.

37. In the given picture, one small square is of size 1 km *1 km. From the starting point O (0, 0) Deepak started to drive towards his home. He first drives 3km in left then he turned to his left and drove 2 km, there he found a temple. He worshipped there and drove 6km in the left direction, there is a zoo and from the zoo, he drives 2km on the right side, then he reached his home. From O Sanjay drove for his school, he drove 1km to his right then took a left turn and drives 2km then again took a right turn and drives 2 km. He found a hospital in the way. From Hospital he drove 3 km and finally reached his school.



(a) What is common abscissa of school, Hospital, Zoo and Deepak's home?
(b) Deepak drove in which quadrants?
(c) Name the two places which are the mirror images of each other. Give the coordinates of each.

38. The taxi fare in a city is as follows: For the first kilometer, the fare is ₹ 8 and for the subsequent distance it is ₹ 5 per km.
Take the distance covered as x km and total fare as ₹ y



(a) Write a linear equation for this information.
(b) Write two solutions for the linear equation formed.
(c) Represent the above situation graphically.