DELHI PUBLIC SCHOOL JAMMU

SESSION-2024-25

SAMPLE PAPER

HALF YEARLY EXAMINATION

CLASS-IX **SUBJECT-MATHEMATICS**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and 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 mark each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3marks and 2 Questions of 2 marks has been provided.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION-A

1. Can we write 0 in the form of p/q?

a. Yes b. No c. Cannot be explained d. None of the above

2. Which of the following is an irrational number?

a. $\sqrt{(4/9)}$ b. $\sqrt{12}/\sqrt{3}$ c. $\sqrt{7}$ d. $\sqrt{81}$

3. Which of the following is a rational number?

a. 0 b. $2\sqrt{3}$ c. $2+\sqrt{3}$ d. π

4. which of the following is a constant polynomial?

a. $4x+1$ b. 3 c. $2x^2$ d. $6x+3$

5. Find the value of 7^2-5^2.

a. 22 b. 23 c. 24 d. 25

6. The coefficient of x in $7x^2+6x-2$ is

a. 2 b. 6 c. -2 d. 7

7. The name of the horizontal line in the cartesian plane which determines the position of a point is called:

a. Origin b. X-axis c. Y-axis d. Quadrants

8. Ordinate of all the points on the y-axis is

a. 0 b. 1 c. -1 d. Any number

9. Abscissa of all the points on the y-axis is

a. 0 b. 1 c. -1 d. Any number

10. The linear equation $3x – y = x – 1$ has

a. No solution b. unique solution c. Two solutions d. Infinitely many solutions

11. Any point on the y-axis is of the form

a. (y, y) b. (0, y) c. (x, y) d. (x, 0)

12. A line joining two endpoints is called:

a. Line segment b. A ray c. Parallel lines d. Intersecting lines

13. A straight angle is equal to:

a. 0° b. 90° c. 180° d. 360°

14. Two parallel lines intersect at:

a. One point b. Two points c. Three points d. Null

15. In triangle ABC, if AB=BC and $\angle B = 70°$, $\angle A$ will be:

a. 70° b. 110° c. 55° d. 130°

16. The angles opposite to equal sides of a triangle are:

a. Equal b. Unequal c. supplementary angles d. Complementary angles

17. which of following needs a proof?

a. Axiom b. Theorem c. Definitions d. postulates

18. Things which are double of same thing are

a. equal b. unequal c. double d. half

19. Assertion: A linear equation $3x + 5y = 2$ has a unique solution.
Reason: A linear equation in two variables has infinitely many solutions.

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

20. Assertion : In ΔABC, $\angle C = \angle A$, BC = 4 cm and AC = 5 cm. Then, AB = 4 cm.
Reason: In a triangle, angles opposite to two equal sides are equal.

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

SECTION-B

Q21 Represent $\sqrt{5}$ on the number line.

Q22 Factorise $x^3 - 23x^2 + 142x - 120$

OR

Find the value of k, if $x - 1$ is a factor of $p(x) = x^2 + x + k$

Q23 What is the name of the horizontal and vertical lines drawn to determine the position of any point in the Cartesian plane?

(ii) What is the name of each part of the plane formed by these two lines?

(iii) Write the name of the point where these two lines intersect.

Q24.ABC is a right triangle in which $\angle A = 90°$ and AB = AC, find $\angle B$ and $\angle C$

OR

ABC is an isosceles triangle with AB = AC. Draw AP ⊥ BC to show that ∠B = ∠C.

Q25 If two lines intersect, prove that their vertical angles are equal.

SECTION C

Q26 Write four solutions for each of the following equations:

(i) $2x+y = 7$ (ii) $5x+ by = 7$

Q27.Factorise $4x^2 + 9y^2 + 16z^2 + 12xy – 24yz – 16xz$

Q28. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR.

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

OR

∠XYZ = 64° and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects ∠ZYP, find ∠XYQ and reflex ∠QYP.

Q29. In an isosceles triangle ABC, with AB = AC, the bisectors of ∠B and ∠C intersect each other at 0. Join A to 0. Show that

(i) OB = OC (ii) AO bisects ∠A

OR

Q30 ΔABC, AD is the perpendicular bisector of BC. Show that Δ ABC is an isosceles triangle.

Q31.Show that two distinct lines cannot have more than one point in common.

SECTION D

Q32. PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD

OR

if x+y = w+z, then prove that AOB is a line, where x,y,w,z are angles formed by 2 intersecting lines.

Q33. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

OR

ABC is a right-angled triangle in which ∠A = 90° and AB = AC. Find ∠B and ∠C.

Q34. Verify that:

$x^3+y^3+z^3-3xyz = \frac{1}{2}(x+y+z)[(x-y)^2+(y-z)^2+(z-x)^2]$

Q35 find a and b if $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} = a + b\sqrt{6}$

SECTION E(Case Based)

Q36 (i) Ankur and Ranjan start a new business together. The amount invested by both partners together is given by the polynomial $p(x) = 4x^2 + 12x + 5$, which is the product of their individual shares.

(i) Coefficient of x^2 in the given polynomial is
(a) 2 (b) 3 (c) 4 (d) 12

(ii) Total amount invested by both, if x = 1000 is
(a) 301506 (b)370561 (c) 4012005 (d)490621
(iii) The shares of Ankur and Ranjan invested individually are

(a) (2x + 1),(2x + 5) (b) (2x + 3),(x + 1) (c) (x + 1),(x + 3) (d) None of these

(iv) Name the polynomial of amounts invested by each partner.

a) Cubic (b) Quadratic (c) Linear (d) None of these

Q37.Explaining concepts of cartesian plane Ramesh asked few questions

(i)Any point on x- axis is of form

a) (0,x) b) (x,0) c) (0,y) d) (y,0)

(ii) in which quadrant (2,-5) lies

a)1st b) 2nd c) 3rd d) 4th

(iii) mirror image of (-3,-5) through x-axis is

a)(3,5) b) (-3,5) c) (3,-5) d) (-3,0)

(iv)Foot of perpendicular from (3,-4) to y-axis is

a)(3,0) b) (0,-4) c) (0,0) d) (0,4)

Q 38. To judge the preparation of students of class Ix on topic number system.Mathematics teacher write two numbers on blackboard 2/11 and 0.38 He asks some questions about the two numbers

(i)Write the decimsl form of 2/11

(a) 0.1818 (b)0.1717 (c)0.1616 (d)none

(ii)The decimal expansion of 2/11 is the type of

(a)Non terminating (b)terminating (c)non terminating repesting(d) none

(iii) write the p/q form of 0.38

(a)7/18 (b)5/18 (c)1/18 (d)none

(iv) 2.56 is

(a)Non terminating (b)terminating (c)non terminating repesting(d) none