

PT-2/HALF YEARLY EXAMINATION, 2022-23
MATHEMATICS

Time - 7:15 AM to 10:20 AM

Class - IX

M.M. : 80

Date – 09.09.2022 (Friday)

Name of the student _____ Section _____

General Instructions –

- The question paper consists of 26 questions divided into 4 sections A, B, C & D
- All questions are compulsory.
- Section A comprises of 11 questions of 2 marks each. Internal choice has been provided in two questions. It contains two case study-based questions of 5 marks each.
- Section B comprises of 7 questions of 3 marks each. Internal choice has been provided in two questions.
- Section C comprises of 3 questions of 4 marks each. Internal choice has been provided in two questions.
- Section D comprises of 3 questions of 5 marks each. Internal choice has been provided in two questions.

SECTION - A (2x11=22 marks)

Q1 A rational number between $\frac{1}{7}$ and $\frac{2}{7}$ is:

- (a) $\frac{1}{14}$ (b) $\frac{1}{21}$ (c) $\frac{5}{14}$ (d) $\frac{5}{21}$

Q2 $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$ is equal to:

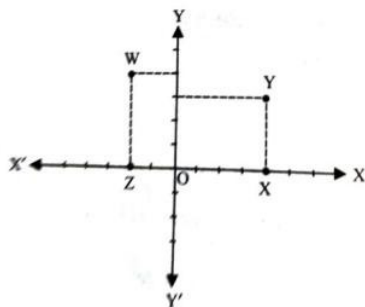
- (a) 2 (b) 4 (c) 8 (d) 20

Q3 Points (1, -2), (1, -3), (-4, 5), (0, 0), (3, -3)

- (a) Lie in III quadrant (b) Lie in II quadrant
(c) Lie in IV quadrant (d) Do not lie in the same quadrant

OR

The co-ordinates of the points X, Y, Z and W from the figure.



- (a) X(4,3), Y(4,3), Z(2,0), W(-2,4) (b) X(4,0), Y(4,3), W(-2,4), Z(-2,0)
(c) X (0,0), Y(4,4), Z (3,8), W (0 4) (d) X(3,3), Y(4,3), Z(1,0), W(-2,4)

- Q4 If the perpendicular distance of a point P from the x-axis is 7 units and the foot of the perpendicular lies on the negative direction of x-axis, then the point P has:
 (a) y-coordinate = 7 or -7 only (b) y-coordinate = 7 only
 (c) y-coordinate = -7 only (d) x-coordinate = -7 only
- Q5 Point (3, 4) lies on the graph of the equation $3y = kx + 7$. The value of k is:
 (a) $\frac{4}{3}$ (b) $\frac{5}{3}$ (c) 3 (d) $\frac{7}{3}$

OR

The graph of linear equation $x+2y = 2$, cuts the y-axis at:

- (a) (2,0) (b) (0,2) (c) (0,1) (d) (1,1)
- Q6 The supplement of $\frac{4}{3}$ of right angle is equal to:
 (a) 60° (b) 100° (c) 110° (d) 70°
- Q7 If the perimeter of an equilateral triangle is 60 cm, then what is its area?
 (a) $200\sqrt{2} \text{ cm}^2$ (b) $100\sqrt{2} \text{ cm}^2$ (c) $100\sqrt{3} \text{ cm}^2$ (d) $200\sqrt{3} \text{ cm}^2$
- Q8 The sides of a triangle are in the ratio of 3 : 4: 5. If its perimeter is 36 cm, then what is its area?
 (a) 32 cm^2 (b) 54 cm^2 (c) 67 cm^2 (d) 72 cm^2
- Q9 The sides of a triangle are 3 cm, 5 cm and 6 cm. What is its area?
 (a) $2\sqrt{3} \text{ cm}^2$ (b) $2\sqrt{14} \text{ cm}^2$ (c) $5\sqrt{12} \text{ cm}^2$ (d) $2\sqrt{5} \text{ cm}^2$
- Q10 An isosceles right triangle has an area of 8 cm^2 . The length of its hypotenuse is:
 (a) $\sqrt{32} \text{ cm}$ (b) $\sqrt{16} \text{ cm}$ (c) $\sqrt{48} \text{ cm}$ (d) $\sqrt{24} \text{ cm}$
- Q11 The value of y at $x = -1$ in the equation $5y = 2$ is
 (a) $\frac{5}{2}$ (b) $\frac{2}{5}$ (c) 0 (d) 10

Q12 **CASE- STUDY BASED QUESTION-1** **(1 × 5)**

Two classmates, Salma and Anil simplified two different expressions during the revision hour and explained to each other their simplifications.

Salma explains simplification of $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ by rationalising the denominator and Anil explains simplification of $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$ by using the identity $(a+b)(a-b)$.

Based on the above information, answer the following questions.

(i) What is the conjugate of $\sqrt{5} + \sqrt{3}$?

- (a) $\sqrt{5} + \sqrt{3}$ (b) $\sqrt{5} - \sqrt{3}$ (c) $\sqrt{5} \times \sqrt{3}$ (d) $\frac{\sqrt{5}}{\sqrt{3}}$

(ii) By rationalising the denominator of $\frac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ Salma got the answer:

- (a) $\frac{\sqrt{2}}{\sqrt{5}-\sqrt{3}}$ (b) $\frac{\sqrt{2}(\sqrt{5}-\sqrt{3})}{2}$ (c) $\sqrt{5} - \sqrt{3}$ (d) $\frac{\sqrt{2}(\sqrt{5}+\sqrt{3})}{2}$

(iii) Anil applied identity to solve $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$

- (a) $(a + b)(a - b)$ (b) $(a + b)(a + b)$ (c) $(a - b)(a - b)$ (d) $(x + a)(x + b)$

(iv) $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$ is equal to:

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

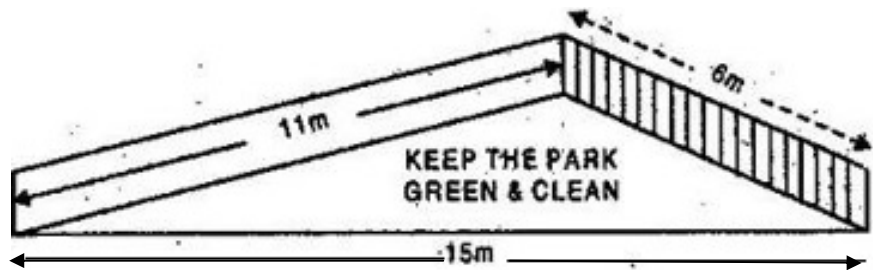
(v) Addition of $(\sqrt{2} + \sqrt{3})$ and $(\sqrt{2} - \sqrt{3})$ is equal to:

- (a) a rational number (b) an Irrational number (c) an Integer (d) a whole number

Q13 CASE-STUDY BASED QUESTON-2

(1 × 5)

There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". The sides of the wall are 15 m, 11 m and 6 m.



Based on the above information, answer the following questions:

(i) The semi perimeter of the triangle is.

- (a) 30 m (b) 16 m (c) 32 m (d) 15 m

(ii) If a, b, c are the lengths of the three sides of a triangle then the formula to find the perimeter of the triangle is:

- (a) $\frac{a+b+c}{2}$ (b) $a + b + c$ (c) $3a$ (d) $2(a + b + c)$

(iii) Area of the triangle is:

- (a) 15 m^2 (b) 30 m^2 (c) $20\sqrt{2} \text{ m}^2$ (d) $20\sqrt{3} \text{ m}^2$

(iv) Formula to find area of the sidewall is:

- (a) $\sqrt{s(s - a)(s - b)(s - c)}$ (b) $\sqrt{s(s + a)(s + b)(s + c)}$
 (c) $\sqrt{s(s + a)(s - b)(s - c)}$ (d) $\sqrt{s(s + a)(s - b)(s + c)}$

(v) Perimeter of the triangle is:

- (a) 35 m (b) 16 m (c) 32 m (d) 15m

Section - B (3 x7=21 marks)

Q14 Find three different irrational numbers between the rational numbers $\frac{5}{11}$ and $\frac{9}{11}$.

Q15 Express $2.417\bar{8}$ in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$

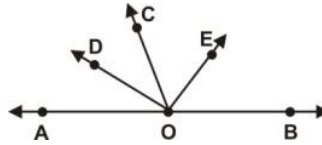
Q16 Find the value of k , if $x = 2, y = 1$ is a solution of the equation $5x + 4y = k$.

Q17 If an angle is half of its complementary angle, then find its degree measure.

OR

An angle is 14° more than its complement. What is its measure?

Q18 In the given figure, OD bisects $\angle AOC$, OE bisects $\angle BOC$ and $OD \perp OE$. Show that points A, O and B are collinear.



Q19 Write any three Euclid's Axioms.

OR

Write any three Euclid's Postulates.

Q20 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.

Section - C (4x3=12 marks)

Q21 Find the value of a and b by rationalising the denominator of the following:

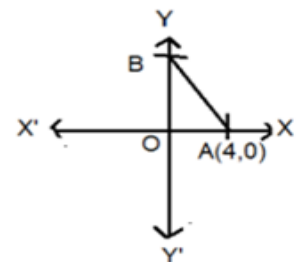
$$\frac{3}{4\sqrt{5} - \sqrt{3}} + \frac{2}{4\sqrt{5} + \sqrt{3}} = a\sqrt{5} + b\sqrt{3}$$

Q22 If $(5)^{x-3} \times (3)^{2x-8} = 225$, then find the value of x .

OR

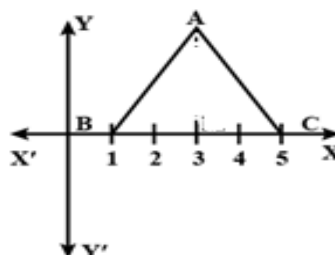
Show that : $(x^{a-b})^{a+b} (x^{b-c})^{b+c} (x^{c-a})^{c+a} = 1$

Q23 In the given figure, triangle AOB with coordinates of A and O as $(4,0)$ and $(0,0)$, $AB=5$ units, find the coordinates of B . Also, find the area of ΔAOB .



OR

In the given figure, ΔABC is an equilateral triangle with coordinates of B and C as $B(1,0)$ and $C(5,0)$. Find the coordinates of vertex A . Also, find the area of the triangle ABC .



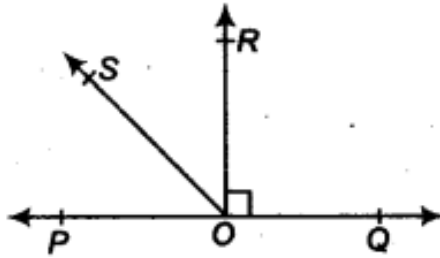
Section-D (5x3=15 marks)

- Q24 The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation in two variables by taking the constant mass equal to 6 kg. Write the equation in standard form and also write the values of a, b and c.

OR

If the work done by a body on application of a constant force is directly proportional to the distance travelled by the body, express this in the form of an equation in two variables by taking the constant force as 3 units. Also write the equation in standard form and write the values of a, b and c.

- Q25 In the given figure, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2} (\angle QOS - \angle POS)$



OR

It is given that $\angle XYZ = 64^\circ$ and XY is produced to point P. Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and reflex $\angle QYP$.

- Q26 In the given figure, lines XY and MN intersect at O. If $\angle POY = 90^\circ$, and $a : b = 2 : 3$, then find c.

