HALF YEARLY EXAMINATION, 2024-25

MATHEMATICS

Time – 3:00 Hrs. **Class – IX** **M.M. : 80**

Date – 20.09.2024 (Friday)

Name of the student _____Section _____

GENERAL INSTRUCTIONS

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 Multiple Choice Questions 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 subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required.

SECTION A

Q1. The decimal expansion of the number $\sqrt{2}$ is

(a) a finite decimal (b) 1.41421

(c) non- terminating recurring (d) non-terminating non-recurring

Q2. The number of consecutive zeros in $2^3 \times 3^4 \times 5^4 \times 7$ is

(a)3 (b) 2 (c) 4 (d) 5

Q3. $0.3\overline{2}$ when expressed in the form $\frac{p}{q}$ (p, q are integers and $q \neq 0$), is

(a) $\frac{8}{25}$ (b) $\frac{29}{90}$ (c) $\frac{32}{99}$ (d) $\frac{32}{199}$

Q4. The ordinate of any point on x-axis is

(a) 0 (b) 1 (c) −1 (d) any number

Q5. A point whose abscissa and ordinate both are negative will lie in

(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

Q6. The distance of the point $P(-6, 8)$ from the origin is

(a) 6 *units* (b) 8 *units* (c)10 *units* (d) 14 *units*

Q7. The graph of the linear equation $4x - 3y - 12=0$ cuts x-axis at point

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

Q8. How many linear equations are satisfied by $x = 2$ and $y = -3$?

(a) only one (b) two (c) three (d)infinitely many

Q9. A linear equation in two variables is of the form $ax + by + c = 0$, where

(a) a≠0, b≠0 (b) a=0, b≠0 (c) a≠0, b=0 (d) a=0, c=0

Q10. In Indus Valley Civilization (about 3000 B.C), the bricks used for construction work were having dimensions in the ratio

(a) 1:3:4 (b)4:2:1 (c) 4:4:1 (d) 4:3:2

Q11. The three steps from the solids to points are

(a) Solids – surfaces – lines - points (b) Solids – lines – surfaces - points

(c) Lines – points – surfaces – solids (d) Lines – surfaces – points - solids

Q12. Things which are double of the same things are

(a)equal (b) unequal

(c) halves of the same thing (d) triple of the same thing

Q13. If the measures of two supplementary angles are $(3x+15)^0$ and $(2x+5)^0$, then x is

(a) 32 (b) 64 (c) 14 (d) 24

Q14. Two straight lines AB and CD cut each other at O. If $\angle BOD=63^0$, then $\angle BOC =$

(a) 63^0 (b) 117^0 (c) 17^0 (d) 153^0

Q15. If supplement of an angle is three times its complement, then the measure of the angle is

(a) 45^0 (b) 40^0 (c) 90^0 (d) 50^0

Q16. Given $\angle POR=3x$ and $\angle QOR=2x+10^0$. If POQ is a straight line, then the value of x is

(a) 30^0 (b)34^0 (c) 36^0 (d) None of these

Q17. Area of a triangle by Heron's formula is (where s is the semi-perimeter of the triangle and a, b, c are the three sides of the triangle)

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

Q18. If every side of a triangle is doubled, then increase in the area of the triangle, is

(a) $100\sqrt{2}$ % (b) 200% (c) 300% (d) 400%

ASSERTION-REASON BASED QUESTIONS

In the following questions (Q.19 & Q.20), a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

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

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

(c) A is true but R is false.

(d) A is false but R is true.

Q19. Assertion (A) - The base and hypotenuse of a right triangle are respectively 5cm and 13cm long. Its area is 30 cm^2

Reason (R) – Area of a right-angled triangle is ½ × base × height.

Q20. Assertion (A) - The area of an isosceles triangle with base $8cm$ and each equal side of length $6cm$, is $8\sqrt{5}\ cm^2$

Reason (R) – Area of an isosceles triangle is $\sqrt{s(s+a)(s+b)(s+c)}$

SECTION B

Q21. If $2^{x+1} = 4^{x-3}$ find x.

OR

If $3^{4x} = (81)^{-1}$, then find x.

Q22. Give an example of two different irrational numbers, the product of which is a rational number.

Q23. What is the area of the triangle formed by joining points $O(0,0)$, $A(6,0)$ and $B(0,4)$ in order.

Q24. If the complement of an angle is equal to the supplement of the thrice of it, find the measure of the angle.

OR

If PQ and RS intersect each other at point O. If $\angle POR : \angle ROQ = 5:7$, find these angles.

Q25. Find the area of an equilateral triangle with side $6\sqrt{3}cm$.

SECTION C

Q26. Write three rational numbers between $\left(-\frac{5}{2}\right)$ and $\left(-\frac{4}{3}\right)$

OR

Represent $\sqrt{6.5}$ on a number line.

Q27. A point lies on the x-axis at a distance of 7 *units* from the y-axis. What are its coordinates? What will be the coordinates if it lies on y-axis at a distance of -7 *units* from x-axis? What is the distance between the points obtained in the above cases?

Q28. If $x = k^2$ and $y = k$ is a solution of the equation $x - 5y + 6 = 0$ find the value of k.

OR

Find the value of c in $3x + 9y - c = 0$, if $x = \frac{1}{-9}$ and $y = \frac{1}{-27}$ is the solution of the given equation.

Q29. Write $5x = \frac{7}{2}$ as an equation in two variables in the form of $ax + by + c = 0$ and indicate the values of a, b, and c.

Q30. Find the area of a triangle whose sides are $13cm$, $14cm$ and $15cm$.

Q31. An isosceles triangle has perimeter $30cm$ and each of the equal sides is $12cm$. Find the area of the triangle.

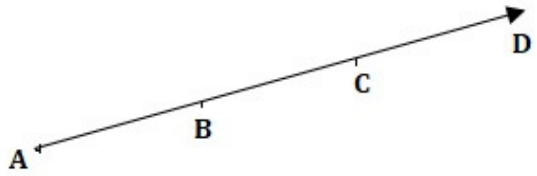
SECTION D

Q32. In which quadrants or on which axis does the following points lie?

a) (−2, 4) b) (−8, −1) c) (6, 0) d) (9, 9) e) (0, −5)

Q33. Write four solutions of the linear equations $x - 2y = 4$. Is $(6\sqrt{2}, \sqrt{2})$ a solution of $x - 2y = 4$?

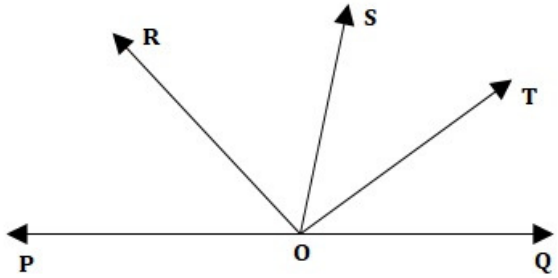
Q34. Write Euclid's fifth postulate. In the given figure, if $AC = BD$, then prove that $AB = CD$. Also state the axiom used in this proof.



OR

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 a figure.Also write any three axioms given by Euclid.

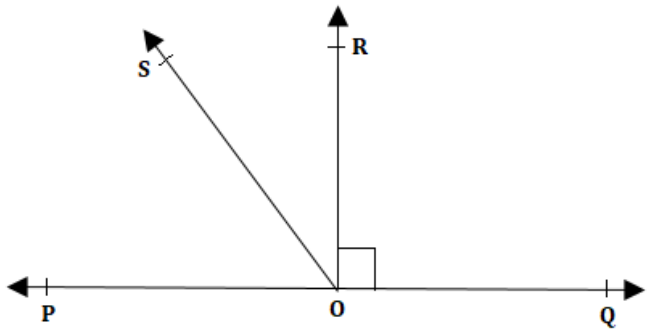
Q35. In the given figure, ray OS stands on a line POQ. Ray OR and ray OT are the angle bisectors of ∠POS and ∠SOQ, respectively. If ∠POS = x, find ∠ROT.



OR

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

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



SECTION E

Q36. If an expression, when the denominator contains a term with a square root (or a number under a radial sign), the process of converting it to an equivalent expression whose denominator is a rational number is called rationalizing the denominator.

i) Classify $\frac{2\sqrt{7}}{7\sqrt{7}}$ as a rational or an irrational number. (1)

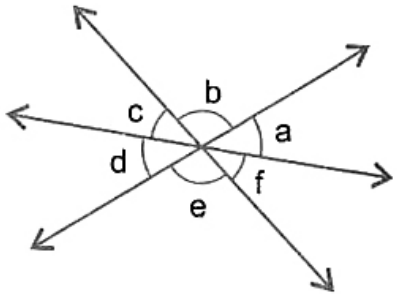
ii) Rationlise the denominator of $\frac{-4}{\sqrt{7}-\sqrt{6}}$ (1)

iii) If $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$, then find the value of *a* and *b*. (2)

OR

Simplify : $\frac{3}{5-\sqrt{3}} + \frac{2}{5+\sqrt{3}}$

Q37. Three coplanar lines intersect in a common point forming angles as shown. Given $a = 50^0$ and $b = 90^0$



i) Find the value of *c*. (1)

ii) Find the value of *d* and *e*. (1)

iii) Find the value of $2e - f$. (2)

OR

Find the value of $a + e + c - 2d$

Q38. A traffic signal board, indicating 'School Ahead', is an equilateral triangle with side '*a*'.

i) Find the perimeter of this board. (1)

ii) If the side of this board measures 16 *cm* then find its area? (1)

iii) If the area of this signal board is $\sqrt{3}a^2$, then find the length of each side of the signal board. (2)

OR

If each side of the signal board measures '*a*' cm then find the length of its altitude.