Devanshi Pahwa
9-C
Rollno-6

The Mother's International School

Mid-term Examination (2024-25)

Subject- Mathematics

Class-IX

Date:17/09/2024

Time: 3 Hours **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 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment carrying 4 marks each.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions of 3 marks and 2 Questions of 5 marks has been provided.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

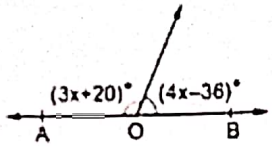
SECTION – A (1 Mark Each)

1. The value of $\frac{1}{\sqrt{10}}$, when $\sqrt{10} = 3.162$ is

   a) 0.3162 b) 31.62 c) 0.03162 d) 316.2

2. Which of the following statements is true?
   a) π and 22/7 are both rationals
   b) π and 22/7 are both irrationals
   c) π is rational and 22/7 is irrational
   d) π is irrational and 22/7 is rational

3. AOB is a straight line, then x is



   a) 29 b) 30 c) 31 d) 28

4. The perpendicular distance of the mirror image (with respect to x axis) of the point P(4,3) from the y axis is

   a) 3 Units b) 4 Units c) 5 Units d) - 3 Units

5. Which of the following is a polynomial?

a) $\frac{x^2}{2} - \frac{2}{x^2}$ b) $\frac{\sqrt{2}}{\sqrt{x^2}} - 1$ c) $x^2 + \frac{x^{\frac{3}{2}}}{\sqrt{x}}$ d) $\frac{x-1}{x+1}$

6. An isosceles right triangle having an area of 8 cm^2. The length of its hypotenuse is:

a) $4\sqrt{2}$ cm b) $2\sqrt{3}$ cm c) $4\sqrt{3}$ cm d) 4cm.

7. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $(x - a)$.

a) 6a b) $5a^2$ c) 5a d) $6a^2$

8. The supplementary angle of the complementary of 25° is

a) 135° b) 125° c) 115° d) 65°

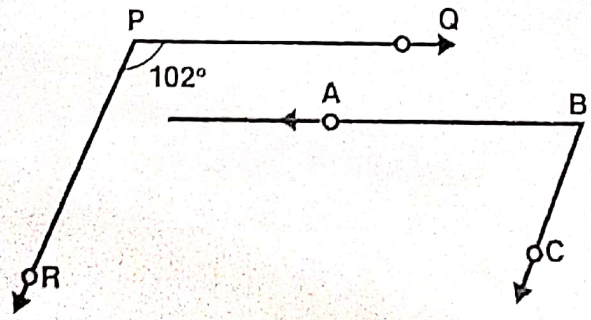
9. If the height of an equilateral triangle is doubled, the ratio of new area to the original area is

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

10. There is a number x such that x^2 is irrational but x^4 is rational. Then x can be

a) 5 b) 2 c) $\sqrt[3]{2}$ d) $\sqrt[4]{5}$

11. In figure, PQ || AB and PR || BC. If ∠QPR = 102°, determine ∠ABC.



a) 102° b) 78° c) 88° d) 92°

12. Which of the following line is perpendicular to x axis?

a) x + y =2 b) 2y+5=0 c) 3x+1=0 d) 2x=5y

13. Which of the following is a binomial of degree 50.

a) $52x^2 - 5^{50}$ b) $-94y^{50} + 50x^{50}$ c) $20x^{25}y^{25}$ d) $x^{25} + x^{25}$

14. Which of the given statement(s) are true?
(i) Point (3, 0) lies in the first quadrant.
(ii) Points (1, –1) and (–1, 1) lying in the same quadrant.
(iii) The coordinates of a point whose ordinate is – ½ and abscissa is 1 are (1, – ½).
(iv) A point lying on the y-axis at 2 units distance from the x-axis. Its coordinates are (0, 2).

a) ii and iv b) i and iii c) ii and iii d) iii and iv

15. The Value of $(256)^{0.16} \times (256)^{0.09}$ is

a) 4 b) 16 c) 64 d) 256.25

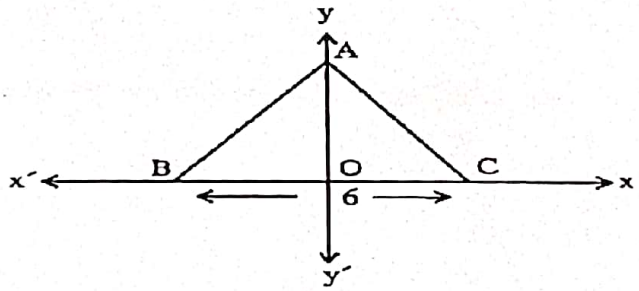
16. If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120°, then the two straight lines, if produced indefinitely, meet on the side on which the sum of the angles is

a) less than 120° b) equal to 180° c) greater than 180° d) is equal to 120°

17. If $f(x) = x^2 - 5x + 7$, then evaluate $f(2) - f(-1)$

a) 11 b) 14 c) - 12 d) 10

18. ABC is an equilateral triangle as shown in the figure. Find the coordinates of its vertex A.



a) $(0,3\sqrt{3})$ b) (3,0) c) $(0, \sqrt{3})$ d) $(3\sqrt{3},0)$

Directions: In question 19 and 20, a statement of Asssertion (A) is followed by a statement of Reason(R).

Choose the correct option.

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

19. Assertion: Every point on the perpendicular bisector is equidistant from the end points of the line segment.

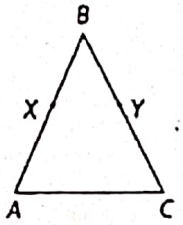
Reason: Every line segment has one and only one mid-point.

20. Assertion: If $(3t-1, 2p+4)$ is a solution of the equation $2x+3y = 6$, then $t = -p$

Reason: A linear equation in two variables has infinitely many solutions.

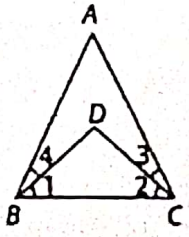
SECTION – B (2 Marks Each)

21. In the given figure, X and Y are the mid points of AB and BC respectively, BX = BY. Show that ABC is an isosceles triangle. State the axiom used.



OR

In the given figure, we have $\angle ABC = \angle ACB$, $\angle 3 = \angle 4$. Show that $\angle 1 = \angle 2$. State the axiom used.



22. A triangular field is in the form of an equilateral triangle with height $20\sqrt{3}$ m. Find the total number of flower beds that can be prepared in the field if each flower bed needs $500 cm^2$ space. (use $\sqrt{3}=1.73$)

OR

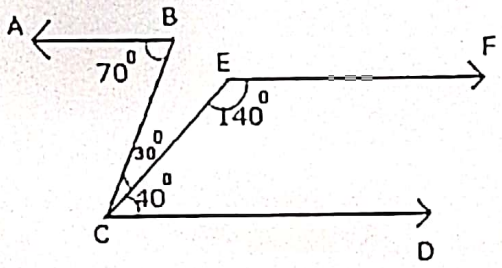
Find the area of a right - angled triangle if the radius of its circumcircle is 3 cm and altitude drawn to the hypotenuse is 2cm.

23. In a triangle ABC, AB = 15cm, BC = 13cm and AC = 14cm. Find the area of triangle ABC and hence its altitude on AC.

24. Verify whether the indicated numbers are the zeros of the given polynomial or not.

$g(x) = 3x^2 - 2, x = \frac{2}{\sqrt{3}}, \frac{-2}{\sqrt{3}}$

25. Show that AB || EF



SECTION – C (3 Marks Each)

26. Represent $\sqrt{4.7}$ geometrically on the real number line.

27. Plot the points A(– 2, 2), B(3, 2), C(3,-4), D(– 4, – 4). Join the points in order. Find the area of the figure obtained.

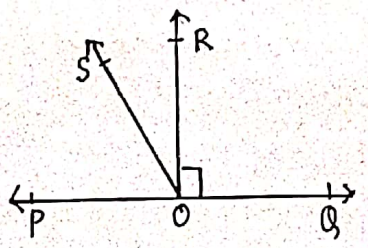
28. If $2x+y = -5$, prove that $8x^3 + y^3 - 30xy + 125 = 0$.

OR

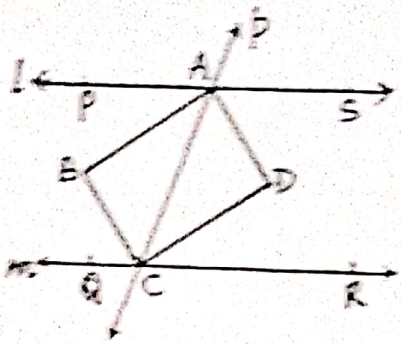
If $\sqrt{m} + \sqrt{n} - \sqrt{p} = 0$, then find the value of $(m + n - p)^2$.

29. Factorise $125 (x - y)^3 + (5y - 3z)^3 + (3z - 5x)^3$

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

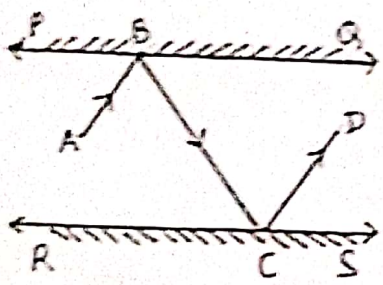


31. Two parallel lines l and m are intersected by transversal p. Show that the quadrilateral formed by the bisectors of the interior angles is a rectangle.



OR

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.



SECTION – D (5 Marks Each)

32. a) If $a = 5 + 2\sqrt{6}$ and $b = \frac{1}{a}$, then what will be the value of $a^2 + b^2$ (3)

b) Express $2.03\overline{6}$ in p/q form. (2)

33. I) Factorise $4x^3 + 7x^2 + 50 - 55x$ using factor theorem. (5)

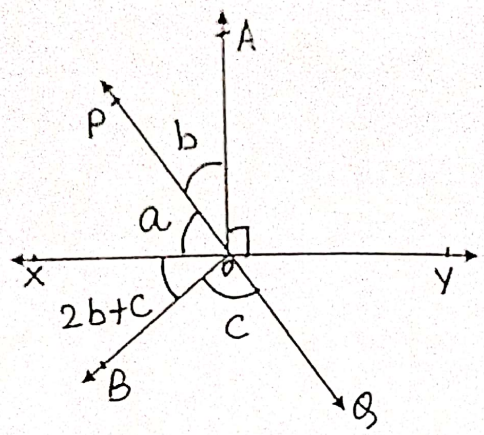
OR

II) a) Factorize: $432bx^3 - 250by^3$ (3)

b) What must be added to $x^3 - 6x^2 + 11x - 8$ to obtain a polynomial exactly divisible by $x - 3$? (2)

34. a) Prove that if two lines intersect each other, then vertically opposite angles are equal. (3)

b) XY and PQ are the lines intersecting at point O. $\overrightarrow{OA}$, $\overrightarrow{OB}$ are rays. $\angle AOY = 90°$ and a:b = 8:1. Find the value of c. (2)



35. Draw a graph to represent the linear equation $3(x - 6) + 4y = 6$. Find the perimeter of a triangle formed by the line and both the axes.

OR

Draw a graph to represent the linear equation $\frac{4(x-1)}{5} = 1 - y$. Find the area of a triangle formed by the line and both the axes.

Case Study

SECTION – E (4 Marks Each)

36. Walls of the triangular park in a society is being used to spread motivational messages like, a) "Make each day your masterpiece", b) "Impossible is just an opinion" c) "Be happy – it drives people crazy. "The perimeter of a triangular park is 50 m. The length of one side of the triangle is 4 m longer than the smaller side, and the third side is 6 m less than twice the smaller side.

Using above information, calculate

(i) length of each side. (2)

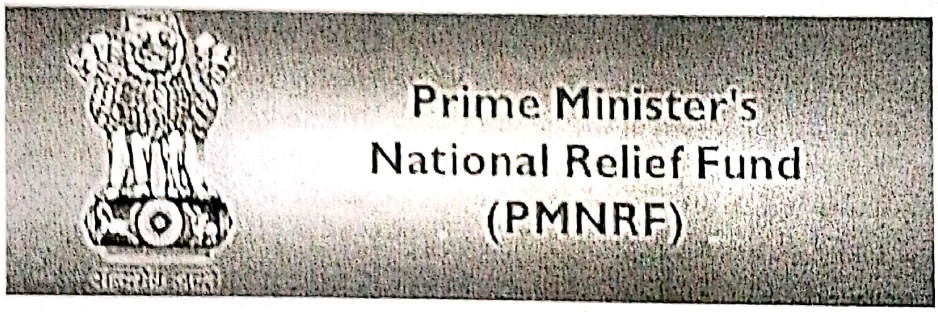
(ii) area of a triangular park. (2)

37. Ravi is a delivery boy. He rides scooter on all working days. The distance covered on scooty is $10(\sqrt{32} + \sqrt{48})$ Km. Assuming that he rides at the uniform speed and takes the time $(\sqrt{8} + \sqrt{12})$ *hours*,

(i) Find the speed of the Scooter. Simplify the expression. (2)

(ii) Find a rational number and an irrational number between $\sqrt{6}$ and $\sqrt{5}$. (2)

38. Prime Minister's National Relief Fund (also called PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc.



Siya contributed ₹40 less than twice the amount Amrit contributed. Both of them together contributed ₹ 200 towards Prime Minister's Relief Fund. Answer the following:

i) Represent the above situation in linear equation in two variables taking 'x' and 'y' as the amount contributed by Siya and Amrit respectively. (1)

ii) For what value of k, coordinate point p(k, 2k) satisfies the above linear equation in two variables. (1)

iii) Express linear equation $x = -\frac{5}{2}$ in standard form. Write the value of a, b, c. (2)

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