SAMPLE PAPER (TERM-I), 2019-20
CLASS –IX
MATHEMATICS

Time allowed - 3 hrs   **Max Marks: 80**

General Instructions:

(i) *The question paper comprises of four sections – A, B, C and D. You are to attempt all the sections.*

(ii) *All questions are compulsory.*

(iii) *Internal choices are given in Section B, C and D.*

(iv) *Question numbers 1 to 3 in Section A are Objective Type Questions including Multiple Choice Questions, Very Short Answer Questions and Fill in the Blanks.*

(v) *Question numbers 4 to 9 in Section B carry 2 marks.*

(vi) *Question numbers 10 to 17 in Section C carry 3 marks.*

(vii) *Question numbers 18 to 23 in Section D carry 4 marks.*

SECTION – A

1. **Choose and write the correct option in each of the following questions.**   (10×1=10)

   (i)   Which point lies on x-axis?

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

   (ii)   In a triangle PQR if $\angle QPR = 80°$ and $PQ = PR$, then $\angle R$ and $\angle Q$ are
       (a) 80°, 70°   (b)   80°, 80°

       (c) 70°, 80°   (d)   50°, 50°

   (iii)   What in 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)   4 cm^2

   (iv)   The graph of the linear equation $2x + 3y = 6$ cuts the *y*-axis at the point

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

   (v)   In two triangles, ABC and PQR, $\angle A = 30°$, $\angle B = 70°$, $\angle P = 70°$, $\angle Q = 80°$ and AB=RP, then

       (a) $\triangle ABC \cong \triangle PQR$ (b) $\triangle ABC \cong \triangle QRP$

       (c) $\triangle ABC \cong \triangle RPQ$ (d)   none of these

   (vi)   The square root of which number is rational

       (a) 7   (b)   1.96   (c)   0.04   (d)   13

   (vii)   Which graph is parallel to x-axis?

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

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

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

(ix)   Through which of the following points, the graph of $y = -x$ passes?

      (a) (1,1)   (b) (0,1)   (c) (-1,1)   (d) (1,0)

(x)   If in a parallelogram its diagonals bisect each other and are equal then it is a,

      (a) Square   (b) Rectangle   (c) Rhombus   (d) Parallelogram

2. **Answer the following questions.**   **(5×1=5)**

    (i)   What will you get on simplifying $8^3 \times 2^4$.

    (ii)   Add $2\sqrt{3}$ and $3\sqrt{2}$.

    (iii)   Find the measure of an angle whose measure is $32°$ less than its supplement.

    (iv)   In a right angled triangle where angle A= $90°$ and AB=AC. What is the value of angle B?

    (v)   Write the number of zeros of $x^2 + 4x + 2$.

3. **Fill in the blanks.**   **(5×1=5)**

    (i)   On rationalising the denominator of , $\dfrac{1}{\sqrt{3} - \sqrt{2}}$ you get _____.

    (ii)   The consecutive angles of a parallelogram are _____.

    (iii)   The zero of the polynomial $p(x) = 3x + 5$ is _____.

    (iv)   A point is such that (abscissa of the point, other than zero) it equals to the ordinate of the point. In which quadrants can the point lie?

    (v)   The sides of a triangle are 3 cm, 5 cm and 6 cm, then its area= _____.
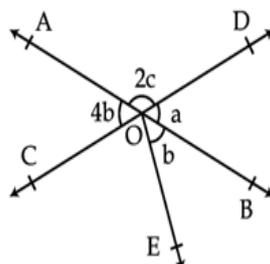
SECTION – B

(Question numbers 4 to 9 carry 2 marks each)

4. Factorise: $8x^3 - (2x - y)^3$

5. The perimeter of a square is (4x+20) cm. What will be the length of its diagonal?

OR

Find the area of a triangle whose perimeter is 180 cm and two of its sides are 80 cm and 18 cm. Also calculate the altitude of the triangle corresponding to the shortest side.

6. If the point (1, 2) lies on the graph of the equation $2y = ax - 4$. Find the value of a?

7. In fig. two straight lines AB and CD intersect each other at O. If $\angle COE = 70°$, find the values of a, b and c.

8. Draw the graph $3x - 2y = 6$ and from the graph, find the value of y when x = −3.

OR

Draw the graph $3x + 2y = 6$ and from the graph, find the value of x when y = −3.

9. Prove that angles opposite to equal sides of an isosceles triangle are equal.

## SECTION – C

(Question numbers 10 to 17 carry 3 marks each)

10. The angles of a quadrilateral are in the ratio 3:5:9:1. Find the greatest angle of the quadrilateral.

11. Give the geometric representation of $2x + 9 = 0$ as an equation.

   (i) in one variable

   (ii) in two variables

12. Locate $\sqrt{8.6}$ on the number line.

13. The volume of a cube is given by the polynomial $p(x) = 27x^3 + 54x^2 + 36x + 8$.

Find the possible expression for the sides of the cube.

14. In a right angled triangle, one acute angle is double the other. Prove that the hypotenuse is double the smallest side.

OR

In $\triangle ABC$, AB = AC and the bisector of angles B and C intersect at point O. Prove that BO=CO and AO bisects $\angle BAC$.

15. In the given figure, $\overline{PQ}$ and $\overline{MN}$ intersect at O.

   (a) Determine y, when x = 60°.
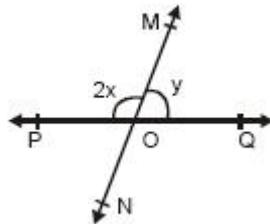
   (b) Determine x, when y = 40°.

16. If $x^3 + mx^2 - x + 6$ has $(x - 2)$ as a factor, and leaves a remainder n when divided by $(x - 3)$, find the values of m and n.
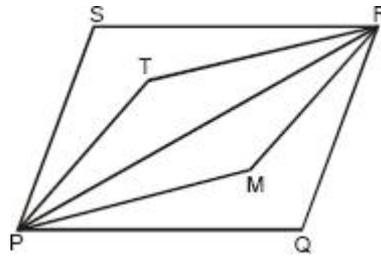
OR

If $x^2 + \dfrac{1}{x^2} = 18$ then find the value of $x - \dfrac{1}{x}$.

17. PQRS is a parallelogram. PS is produced to meet M so that SM = SR and MR is produced to meet PQ produced at N. Prove that QN= QR.

OR

In the given figure, T and M are two points inside a parallelogram PQRS such that PT=MR and PT || MR. Then prove that

(a) ΔPTR ≅ ΔRMP

(b) RT || PM and RT = RM

SECTION – D

(Question numbers 18 to 23 carry 4 marks each)

18. Draw the graph of following linear equation in two variables.

$x + y = 8$

19. Show that $\dfrac{x^{-1}+y^{-1}}{x^{-1}}+\dfrac{x^{-1}-y^{-1}}{x^{-1}}=\dfrac{x^2+y^2}{xy}$
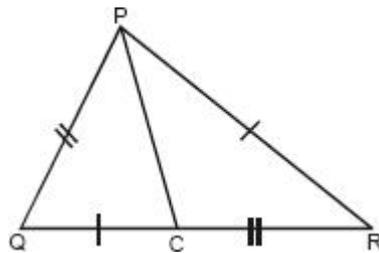
20. In a ΔABC, DE is parallel to BC and D is the mid-point of side AB. Find the perimeter of ΔABC when AE = 4.5 cm, DE = 5 cm and DB = 3.5 cm.

21. Find the values of a and b , if $x^3 + ax^2 - bx + 10$ is divisible by $x^2 - 3x + 2$.

OR

Using factor theorem, factorize $x^3 - 6x^2 + 3x + 10$.

22. In the given figure, triangles PQC and PRC are such that QC = PR and PQ = CR. Prove that ∠PCQ = ∠CPR.

OR

If parallel lines are intersected by the transversal, prove that the bisectors of the two pairs interior angles enclose a rectangle.

23. Find the height of a trapezium in which parallel sides are 25 cm 77 cm and non-parallel sides and 26 cm and 60 cm. Given the area of the trapezium as 1644 cm^2.

OR

A farmer has a triangular field with sides 240 m, 200 m and 360 m, where he grew wheat. In another triangular field with sides 240 m, 320 m and 400 m adjacent to the previous field, he wanted to grow potatoes and onions (see figure). He divided the field into two parts by joining the mid point of the longest side to the opposite vertex and grew potatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat, potatoes and onions?