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SAMPLE PAPER FOR HALF YEARLY EXAM (2019-20)

SUBJECT:MATHEMATICS   MAX. MARKS :80
CLASS:IX   DURATION : 3 HRS

(i).   **All** questions are compulsory.
(ii).   This question paper contains 4**0** questions divided into four Sections A, B, C andD.
(iii). **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each and **Section D** comprises of 6 questions of **4 marks**each.
(iv).   There is no overall choice. However, an internal choice has been provided in two questions of 2 marks each, two questions of 3 marks each and two questions of 4 marks each. You have to attempt only one of the alternatives in all suchquestions.
(v).   Use of Calculators is notpermitted

SECTION – A
**Questions 1 to 20 carry 1 mark each.**

1. The graph of the linear equation in two variables $y = mx$ is
   (a) a line parallel to x – axis   (b) a line parallel to y – axis
   (c) a line passing through the origin   (d) not a straight line

2. A linear equation in two variables has
   (a) no solution   (b) only one solution
   (c) only two solutions   (d) infinitely many solutions

3. Point (5, 0) lies on the:
   (a) I quadrant   (b) II quadrant   (c) x – axis   (d) y – axis

4. On rationalising the denominator of $\frac{1}{3-\sqrt{2}}$ we obtain ……………….
   (a) $3 + \sqrt{2}$ (b) $\frac{3+\sqrt{2}}{7}$ (c) $\frac{3-\sqrt{2}}{7}$ (d) $3 - \sqrt{2}$

5. The value of $\left(\sqrt{5} + \sqrt{2}\right)^2$ is:
   (a) $7 + 2\sqrt{5}$ (b) $1 + 5\sqrt{2}$ (c) $7 + 2\sqrt{10}$ (d) $7 - 2\sqrt{10}$

6. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder …..
   (a) – 1   (b) 1   (c) 0   (d) 2

7. ABCD is a rhombus such that $\angle ACB = 40^0$, then $\angle ADB = $?
   (a) 45^0 (b) 50^0 (c) 45^0 (d) 60^0

8. In a right angles triangle ……………… is the longest side.
   (a) hypotenuse   (b) perpendicular   (c) base   (d) none of these

9. The angle which is equal to its complement is …………
   (a) 60^0 (b) 30^0 (c) 40^0 (d) 72^0

10. If $x + 2$ is a factor of $x^3 + ax^2 + ax - 1$ then the value of a is ….
   (a) $\frac{2}{3}$ (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) $\frac{1}{2}$

11. The coordinates of the point lying on $y - axis$ with coordinate – 3 is ….
   (a) $(- 3, 0)$ (b) $(3, 0)$ (c) $(0, -3)$ (d) $(0, 3)$

12. If – 1 is the zero of the polynomial $p(x) = ax^3 - x^2 + x + 4$, then find the value of a

13. Write an irrational number between $\sqrt{2}$ and $\sqrt{3}$.

14. Factorise: $12x^2 - 7x + 1$

15. Simplify: $(256)^{\frac{5}{8}}$

16. In $\triangle ABC$, AB = 5 cm, BC = 8 cm and CA = 7 cm. If D and E are respectively the mid-points of AB and BC, determine the length of DE.

17. Can all the angles of a quadrilateral be acute angles? Give reason for your answer.

18. The angles of triangle are $(x + 10)^0$, $(2x - 30)^0$ and x^0. Find the value of x.

19. At what point the graph of the linear equation $x + y = 5$ cuts the x-axis?

20. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.

SECTION – B

Questions 21 to 26 carry 2 marks each

21. One angle of a quadrilateral is of 108^0 and the remaining three angles are equal. Find each of the three equal angles.

22. In the below figure, PR > PQ and PS bisects $\angle$ QPR. Prove that $\angle$ PSR > $\angle$ PSQ.
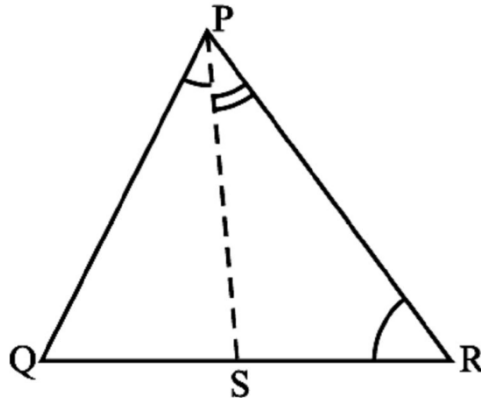
23. At what point does the graph of the linear equation $x + y = 5$ meet a line which is parallel to the y-axis, at a distance 2 units from the origin and in the positive direction of x-axis.
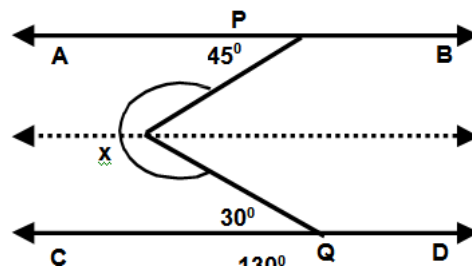
OR

Write $3x + 2y = 18$ in the form of $y = mx + c$. Find the value of m and c. Is (4, 3) lies on this linear equation?

24. Without actually calculating the cubes, find the value of $(28)^3 + (-15)^3 + (-13)^3$

25. Simplify $\frac{5-2\sqrt{3}}{5+2\sqrt{3}}$ by rationalizing the denominator.

OR

Simplify $8\sqrt{242} - 5\sqrt{50} + 3\sqrt{98}$

26. In the adjoining figure find the value of x.

SECTION – C

Questions 27 to 34 carry 3 marks each

27. Plot the following points and write the name of the figure thus obtained : P(–3, 2), Q (–7, –3), R (6, –3), S (2, 2).

28. Show that the bisectors of angles of a parallelogram form a rectangle.

29. Solve the equation $2y + 9 = 0$, and represent the solution(s) on (i) the number line,(ii) the Cartesian plane.

30. In the below figure, if QT $\perp$ PR, $\angle$TQR $= 40°$ and $\angle$SPR $= 30°$, find x and y.
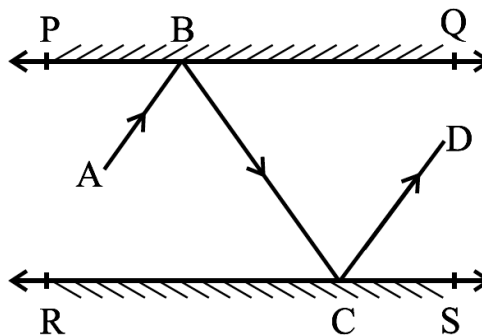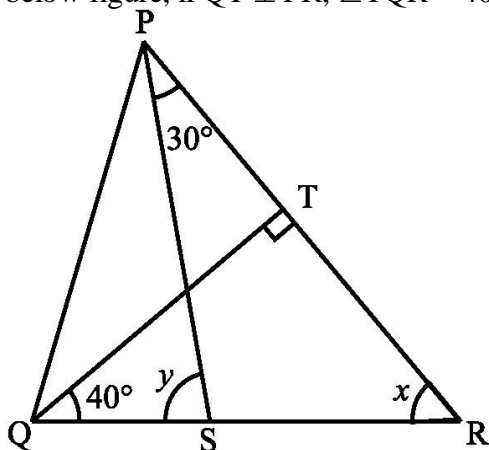

OR

In the above right sided figure, 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.

31. If $x + y = 12$ and $xy = 27$, find the value of $x^3 + y^3$.

32. Show that 1.23535353……. can be expressed in the form of $\dfrac{p}{q}$, where p and q are integers and $q \neq 0$.

33. The taxi fare in a city is as follows: For the first kilometre, the fare is Rs 8 and for the subsequent distance it is Rs 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this information, and draw its graph.

34. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that (i) AD bisects BC (ii) AD bisects $\angle$A.

OR

Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see the below figure). Show that (i) $\triangle$AOB $\cong$ $\triangle$DOC (ii) O is also the mid-point of BC.
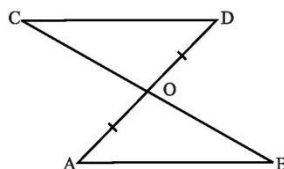
35. Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.

36. If polynomials $ax^3 + 3x^2 – 3$ and $2x^3 – 5x + a$ leaves the same remainder when each is divided by $x – 4$, find the value of a.
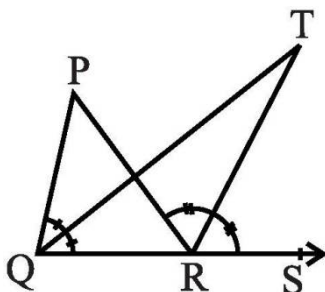
<div align="center">OR</div>

Verify : (i) $x^3 + y^3 = (x + y)(x^2 – xy + y^2)$ (ii) $x^3 – y^3 = (x – y)(x^2 + xy + y^2)$

37. Simplify $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+2} + \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ by rationalizing the denominator.

38. Prove that "*The line segment joining the mid-points of two sides of a triangle is parallel to the third side and half of it.*"

<div align="center">**OR**</div>

Show that the quadrilateral formed by joining the mid-points the sides of a rhombus, taken in order, form a rectangle.

39. Three vertices of a rectangle are (4, 2), (– 3, 2) and (– 3, 7). Plot these points and find the coordinates of the fourth vertex.

40. In the above right sided figure, the side QR of . PQR is produced to a point S. If the bisectors of $\angle$PQR and $\angle$PRS meet at point T, then prove that $\angle QTR = \frac{1}{2} \angle QPR$.