

CLASS: IX

SUBJECT: MATHEMATICS

TIME ALLOWED: 3 HOURS

MAX. MARKS: 80

GENERAL INSTRUCTIONS: -

1. This Question Paper has 5 Sections A-E. There are 38 questions in all.
2. Section A has 20 MCQs 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.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION-A

1. The decimal expansion of the number $\sqrt{2}$ is: 1
a. a finite decimal b. 1.41421
c. non-terminating recurring d. non-terminating non-repeating
2. Degree of the polynomial $4x^4 + 0x^3 + 0x^5 + 2x + 7$ is: 1
a. 4 b. 5 c. 3 d. 7
3. $\frac{1}{\sqrt{16}-\sqrt{8}}$ is equal to: 1
a. $\frac{1}{2}(4 - 2\sqrt{2})$ b. $\frac{1}{4+2\sqrt{2}}$ c. $4 - 2\sqrt{2}$ d. $4 + 2\sqrt{2}$
4. One of the factors of $(25x^2 - 1) + (1 + 5x^2)$ is: 1
a. $5 + x$ b. $5 - x$ c. $5x - 1$ d. $10x$
5. Ansh has a toy in the shape of an isosceles right angled triangle. If the length of two equal sides of an upper face of toy are 100 cm each, then the area of the face of the toy will be _____ cm^2 . 1
a. 5000 b. 500 c. 1000 d. 2500

6. $3x+0y+9 = 0$ will have:

- a. Unique solution b. Two solutions c. Infinitely many solutions d. No solutions

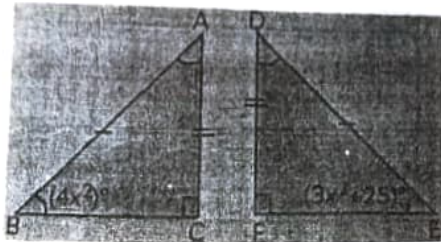
7. Jaya bought some chocolates which is 2 more than thrice the number of chocolates that Rashmi has. Then which among the following can be the correct equation?

- a. $2x + 3 = y$ b. $x = 2 + 3y$ c. $x + 2 = 3y$ d. $3x + y = 2$

8. Which of the following points lies above x-axis?

- a. (-1, 2) b. (2, 0) c. (-1, -5) d. (0, -3)

9. Akash has a rectangular cardboard sheet. He folded it and cut out triangular shapes ABC and DEF from it, such that $\triangle ABC \cong \triangle DEF$ by RHS congruence rule (as shown in fig.) The value of x is:



- a. 75° b. 105° c. 125° d. 5°

10. Jitu was given a riddle by Pragya who stated that an angle is 24° less than its complementary angle. The angle's measure is:

- a. 36° b. 33° c. 66° d. 57°

11. Shreyansh wants to prove that $\triangle FGH \cong \triangle JKL$ using the SAS rule. He knows that $FG = JK$ and $FH = JL$. What additional piece of information does he need?

- a. $\angle F = \angle J$ b. $\angle H = \angle L$ c. $\angle G = \angle K$ d. $\angle F = \angle G$

12. Two parallel lines cannot have _____ in common.

- a. Two point b. one point c. 60 point d. any point

13. Any point on line $x = -y$ is of the form:

- a. (k, -k) b. (0, k) c. (k, 0) d. (k, k)

14. The perimeter of a right angled triangle is 24 cm and its hypotenuse is 10 cm, the area of the triangle is:

- a. 28 cm^2 b. 29 cm^2 c. 24 cm^2 d. 21 cm^2

15. How many linear equations in x and y can be satisfied by $x = 1$ and $y = 2$?

- a. only one b. Two c. Infinitely many d. Three

16. On plotting the points $O(0,0)$, $A(3,0)$, $B(3,4)$, $C(0,4)$ on a cartesian plane and joining OA , AB , BC and OC , which of the following shapes is obtained in the graph?
- a. square b. rectangle c. trapezium d. rhombus

17. If $\frac{x}{y} + \frac{y}{x} = -1$ ($x, y \neq 0$), the value of $x^3 - y^3$ is:
- a. -1 b. 1 c. $\frac{1}{2}$ d. 0

18. Which of the following is a polynomial?
- a. $\frac{x^2}{2} - \frac{2}{x^2}$ b. $\sqrt{2x} - 1$ c. $x^2 + \frac{x^{3/2}}{\sqrt{x}}$ d. $\frac{x-1}{x-2}$

19. Assertion: $\sqrt{2} \times \sqrt{7} = \sqrt{14}$ is an irrational number
Reason: The product of two irrational numbers is an irrational number.
- a. Both assertion and reason are true and reason is the correct explanation of assertion.
b. Both assertion and reason are true but reason is not the correct explanation of assertion.
c. Assertion is true but the reason is false.
d. Assertion is false but the reason is true.

20. Assertion: If a, b, c are the three sides of a triangle, then the area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$
Reason: Semi-perimeter of the triangle is, $s = \frac{a+b+c}{3}$
- a. Both assertion and reason are true and reason is the correct explanation of assertion.
b. Both assertion and reason are true but reason is not the correct explanation of assertion.
c. Assertion is true but the reason is false.
d. Assertion is false but the reason is true.

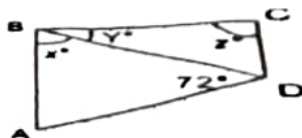
SECTION-B

21. Write $\frac{1}{3-2\sqrt{2}}$ in simplified form after rationalizing the denominator. 2

22. It is given that $\triangle ABC \cong \triangle FDE$ and $AB = 5$ cm. $\angle B = 30^\circ$ and $\angle A = 80^\circ$. Find $\angle E$ and length of side DF . 2

23. Represent $2x = 3y - 6$ in standard form, write a, b and c . Also, find two solutions of the equation. 2

24. In the given figure, $AB \parallel DC$. If $x = \frac{4}{3}y$ and $y = \frac{3}{8}z$, find $\angle BCD$. 2



25. The area of an equilateral triangle is $25\sqrt{3}\text{cm}^2$. Find the perimeter of the triangle. 2

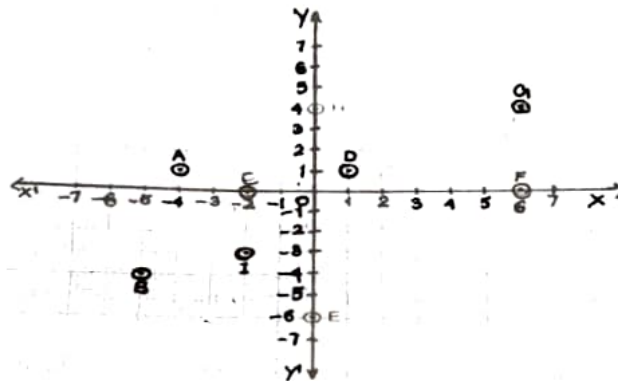
SECTION-C

26. Simplify the following expression, also mention the laws used: 3

$$\frac{9^{\frac{1}{3}} \times 27^{-\frac{1}{2}}}{3^{\frac{1}{6}} \times 3^{-\frac{2}{3}}}$$

27. Write the following square in the expanded form: $(2x - y + z)^2$ 3

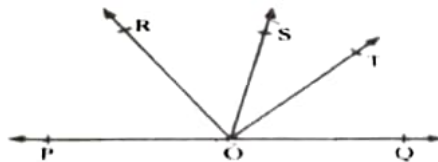
28. On the basis of the given graph, answer the following questions. 3



- i) the coordinates of the point B
- ii) the point identified by the coordinates (1,1)
- iii) the coordinates of the point F
- iv) the abscissa of the point D
- v) the ordinate of the point C
- vi) the quadrant in which B and I lies

29. The sides of a triangular plot are in the ratio of 3 : 5 : 7 and its perimeter is 300 m. Find its area. 3

30. In figure, ray OS stands on a line POQ. Ray OR and OT are angle bisectors of $\angle POS$ and $\angle SOQ$, respectively. If $\angle POS = x$, find $\angle ROT$. 3



31. If the equation $-(k + 1)x + ky - 5k = 1 - 2y$, where $k > 0$ is expressed in the form $ax + by + c = 0$, gives $c = 6$, then what are the values of a and b ? 3

SECTION-D

32. If $A = 0.36363636\dots$ and $B = 0.636363\dots$, then what is the value of $\frac{1}{A} + \frac{1}{B}$? 5

33. Plot the points A(0,3), B(5,3), C(4,0) and D(-1,0) on the graph paper. Identify the figure ABCD and find whether the point (2,2) lies inside the figure or not? Also, write the mirror image of the point B(5,3) along the x-axis. 5
34. a. If $x + y + z = 9$ and $x^2 + y^2 + z^2 = 35$, find the value of $x^3 + y^3 + z^3 - 3xyz$. 5
 b. Check if $g(x) = x - 2$ is a factor of $p(x) = x^3 - x^2 + 2x - 4$
35. In the right triangle ABC, right angled at C, M is the midpoint of hypotenuse AB. C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B. Show that: 5
 i) $\triangle AMC \cong \triangle BMD$
 (ii) $\angle DBC$ is a right angle
 (iii) $\triangle DBC \cong \triangle ACB$
 iv) $CM = \frac{1}{2} AB$

SECTION-E

36. Junk food is food that contains high levels of salt, sugar, fats and lack of nutrients such as vitamins, fiber and minerals, consuming them can lead to short and long-term health complications, including weight gain. If 'a' be the number of children who take junk food and 'b' be the number of children who take healthy food such that $a > b$ where a and b are the zeros of quadratic polynomial 4

$$p(y) = 2y^2 - 18y + 40$$



- i) Find the number of students who take healthy food.
 ii) How many students take junk food?
 iii) Find the value of $p(-1)$.

37. Interior decorator Natasha designed a floral carpet that was made up of 32 well-designed triangular pieces, the measurements of the triangular pieces are 18cm, 56cm, 70cm. The rate of stitching the carpet is 70 paise per cm^2 . 4



- i) Find the perimeter of one triangular piece.
 ii) Find the semi-perimeter of a triangular piece.
 iii) Find the total area of carpet made up of 32 triangular pieces.

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 By: VIKRANT KUMAR

38. On his birthday, Manoj planned that this time he would celebrate his birthday in a small orphanage center. He bought apples to give to children and adults working there. Manoj donated 2 apples to each child and 3 apples to each adult working there along with a birthday cake. He distributed 60 total apples. 4



- i) Represent the above situation in linear equations in two variables by taking the number of children as 'x' and the number of adults as 'y'
- ii) If the number of children is 15, then find the number of adults?
- iii) Find the value of b, if $x = 5$, $y = 0$ is a solution of the equation $3x + 5y = b$.