Time 3 to $3\frac{1}{2}$ Hrs   Maths 9TH (Term 1)   M.M. 90

SECTION – A

Question numbers 1 to 8 carry one mark each. For each questions, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. The simplified form of $\frac{13^{1/5}}{13^{1/3}}$ is :

   (A) $13^{2/15}$ (B) $13^{8/15}$ (C) $13^{1/3}$ (D) $13^{-2/15}$

2. Which of the following is a polynomial in one variable :

   (A) $3 - x^2 + x$ (B) $\sqrt{3x} + 4$ (C) $x^3 + y^3 + 7$ (D) $x + \frac{1}{x}$
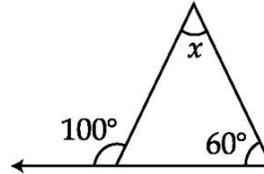
3. Which of the following is a quadratic polynomial ?

   (A) $3x^3 + 5x + 4$ (B) $5 + 3x + 2x^2 + 7x^3$ (C) $x^2 + \frac{1}{x} + 3$ (D) $(x - 1)(x + 1)$

4. If $\frac{x}{y} + \frac{y}{x} = -1$, $(x, y \neq 0)$, then, the value of $x^3 - y^3$ is :

   (A) 1   (B) - 1   (C) 0   (D) $\frac{1}{2}$

5. Value of x in the figure below is :

   (A) 80˚   (B) 40˚   (C) 160˚   (D) 20˚

6. In ∆ABC, if AB=AC, B=50˚, then A is equal to : (A) 40˚ (B) 50˚ (C) 80˚ (D) 130˚

7. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2}$ cm then area of the triangle is :

   (A) $24\sqrt{2}$ cm^2 (B) $24\sqrt{3}$ cm^2 (C) $48\sqrt{3}$ cm^2 (D) $64\sqrt{3}$ cm^2

8. The side of an isosceles right triangle of hypotenuse $5\sqrt{2}$ cm is :

   (A) 10 cm   (B) 8 cm   (C) 5 cm   (D) $3\sqrt{2}$ cm
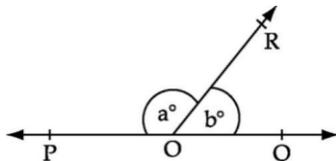
SECTION B   2 MARKS EACH

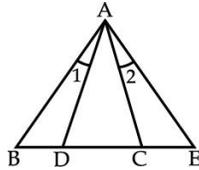9. If $x=3+2\sqrt{2}$, then find whether $x + \frac{1}{x}$ is rational or irrational.

10. Without actually calculating the cubes, find the values of $55^3 - 25^3 - 30^3$.

11. If $x + y=8$ and $xy=15$, find x^2+y^2.

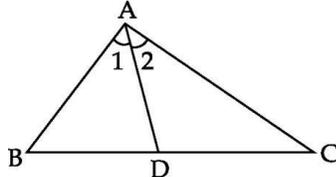12. In the given figure, if ∠POR and ∠QOR form a linear pair and a − b=80˚, then find the value of a and b.

13. In figure, ∠B=∠E, BD=CE and ∠1=∠2. Show ΔABC ≅ Δ AED.

OR

In the figure given below AC > AB and AD is the bisector of ∠A. Show that ∠ADC > ∠ADB.

14. Find the co-ordinates of the point which lies on y–axis at a distance of 4 units in negative direction of y–axis.

    (A) (- 4, 0)   (B) (4, 0)   (C) (0, - 4)   (D) (0, 4)

Section-C

Question numbers 15 to 24 carry three marks each.

15. Represent $\sqrt{2}$ on the number line.

OR

Express $18.\overline{48}$ in the form of $\frac{p}{q}$ where p and q are integers, q ≠ 0.

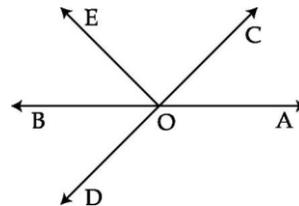16. If x=5 - $2\sqrt{6}$ then find the value of $x^2 + \frac{1}{x^2}$.

17. If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$.
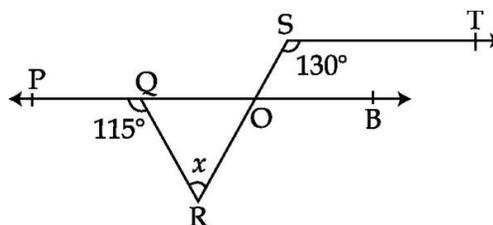
OR

Factorise : $x^3 - 3x^2 - 10x + 24$

18. Using suitable identity evaluate $(998)^3$.

19. In the given figure, lines AB and CD intersect at O. If ∠AOC +∠BOE =70˚ and BOD= 40˚ , find ∠BOE and reflex ∠EOC.

OR

In the following figure, PQ ‖ ST, ∠PQR=115˚and ∠RST=130˚. Find
the value of x.
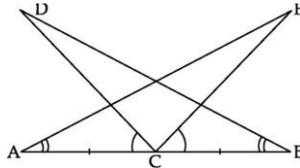

20. In the given figure, ABC is a triangle with BC produced to D. Also bisectors of ∠ABC and ∠ACD meet at E. Show that ∠BEC=$\frac{1}{2}$ ∠BAC.
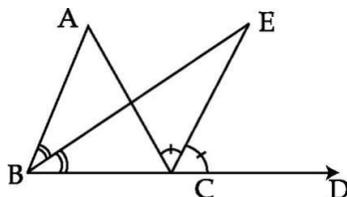
21. In the given figure, sides AB and AC of Δ ABC are extended to points P and Q respectively. Also ∠PBC < ∠QCB. Show that AC > AB.
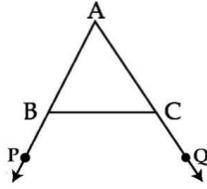
22. In the given figure, AC=BC, ∠DCA= ∠ECB and ∠DBC = ∠EAC. Show that Δ DBC ≅ ΔEAC and hence DC=EC.

23. The degree measure of three angles of a triangle are x, y, and z. If $z = \frac{x+y}{2}$ then find the value of z.

24. The perimeter of a triangular ground is 900 m and its sides are in the ratio 3 : 5 : 4. Using Heron's formula, find the area of the ground.

Section-D

Question numbers 25 to 34 carry four marks each.

25. If x= $\left(2+\sqrt{5}\right)^{1/2} + \left(2-\sqrt{5}\right)^{1/2}$ and y= $\left(2+\sqrt{5}\right)^{1/2} - \left(2-\sqrt{5}\right)^{1/2}$ then evaluate $x^2 + y^2$.

OR

If $a = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and b = $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find the value of $a^2 + b^2 - 5ab$.

26. Rationalize the denominator of $\frac{4}{2+\sqrt{3}+\sqrt{7}}$

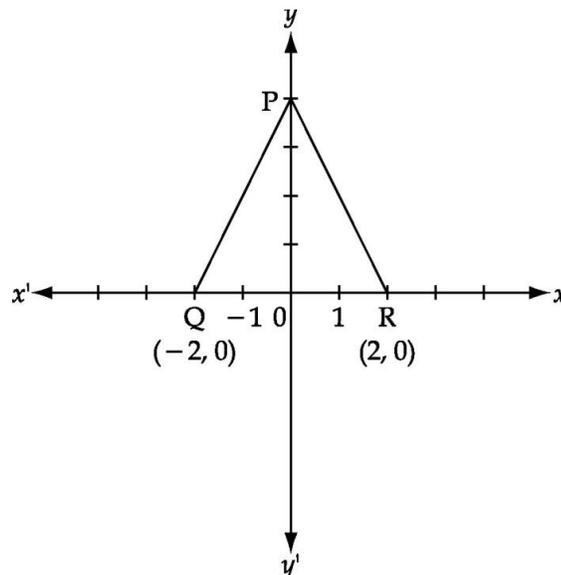27. Factorize : (a) $4a^2 - 9b^2 - 2a - 3b$.   (b) $a^2+b^2 - 2(ab - ac + bc)$

28. If (x+5) is a factor of $x^3 + 2x^2 - 13x + 10$, find the other factors.

29. Factorize $a^7 - ab^6$

OR

If $ax^3 + bx^2 + x - 6$ has $x + 2$ as a factor and leaves remainder 4 when divided by $x - 2$, find the values of a and b.

30. In the given figure, PQR is an equilateral triangle with coordinates of Q and R as (- 2, 0) and (2, 0) respectively. Find the coordinates of the vertex P.

31. In the adjoining figure, the side QR of ΔPQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that . ∠QTR = $\frac{1}{2}$ ∠ QPR.
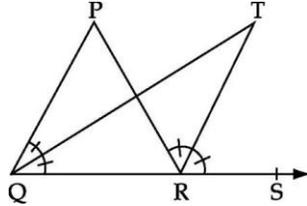
32. In the following figure, the sides AB and AC of ΔABC are produced to D and E respectively. If the bisectors of ∠ CBD and ∠BCE meet at O, then show that ∠BOC = 90° - $\frac{\angle A}{2}$.
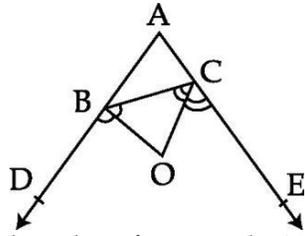
33. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

34. In a triangle ABC, AB = AC, E is the mid point of AB and F is the mid point of AC. Show that BF = CE.

ALL THE BEST