Q.2 Write short answers to any eighteen from the following questions.

1. Solve the following equation $x^2 - 3x - 18 = 0$ by quadratic formula.

Sol.
$$x^2 - 3x - 18 = 0$$
$$a = 1, \quad b = -3, \quad c = -18$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-3 \pm \sqrt{9 - 4(1)(-18)}}{2}$$
$$x = \frac{3 \pm \sqrt{9 + 72}}{2} = \frac{3 \pm \sqrt{81}}{2}$$
$$x = \frac{3 \pm 9}{2} \Rightarrow x = \frac{12}{2} = 6$$
$$x = \frac{-6}{2} = -3$$

2. Discuss the nature of the roots of the equation $2x^2 - 7x + 3 = 0$.

Sol. Here,
$$a = 2, \quad b = -7, \quad c = 3$$
$$Disc = b^2 - 4ac$$
$$= (-7)^2 - 4(2)(3)$$
$$= 49 - 24$$
$$= 25 = 5^2$$
Hence roots of given equation are rational and unequal.

3. For what value of K the sum of roots of $3x^2 + Kx + 5 = 0$ may be equal to the product of roots.

Sol.
$$3x^2 + Kx + 5 = 0$$
$$a = 3, \quad b = K, \quad c = 5$$
$$sum\ of\ roots = Product\ of\ roots\ (given)$$

$$\frac{-b}{a} = \frac{c}{a}$$
$$K = \frac{9}{3} \times -3 = -5$$

4. Find the 7th term of an A.P, 4, 7 ...

Sol.
$$1, 4, 7, \ldots \ldots 7\ term$$
$$a_1 = 1, a_2 = 4, d = 4 - 1 = 3, d = 3$$
$$a_n = a_1 + (n-1)d$$
$$a_7 = a_1 + 6d = 1 + 6(3)$$
$$a_7 = 1 + 18 = 19$$

5. Find the sum of the series $3 + 11 + 19 + \ldots$ to 16 terms.

Sol.
$$a = 3, \quad d = 11 - 3 = 8, \quad n = 16$$
$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$
$$S_{16} = \frac{16}{2}\left[2(3) + (16-1)8\right]$$
$$= 8\left[6 + 15(8)\right] = 8[6 + 120] = 8 \times 126$$
$$S_{16} = 1008$$

6. Find the 6th term in G.P $1, 3^3, 3^6, \ldots$

Sol.
$$a_1 = 1, \quad a_2 = 3^3 = 27, \quad a_6 = ?$$
$$r = \frac{a_2}{a_1} = \frac{27}{1}$$
$$a_n = a_1 r^{n-1} \Rightarrow a_6 = a_1 r^5 = 1(27)^5 = 27^5$$

7. Find the geometric mean between 4/3 and 243.

Sol.
$$Here \quad a = \frac{4}{3}, \quad b = 243$$
$$G.M = \pm\sqrt{ab} = \pm\sqrt{\frac{4}{3}(243)} = \pm\sqrt{4(81)}$$
$$G.M = \pm\sqrt{324} = \pm 18$$

8. Write the formulas of sum of the first n terms of a geometric sequence.

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Lalit Jain

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