CHAPTER - 4: QUADRATIC EQUATIONS

IMPORTANT QUESTIONS

1. Quadratic equation with example $3x^2 + 4x - 1 \; and \; 3x^2 + 2\sqrt{x} + 4 = 0.$
2. Find the roots of the quadratic equation by factorization. $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$
3. Find the root of the equation $x + \frac{1}{x} = 3.$
4. Solve the equation: $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}$.
5. Solve: : $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0, x \neq 3, x \neq -\frac{3}{2}$
6. Solve the quadratic equation
   (i) $x^2 - 4ax + 4a^2 - b^2 = 0$
   (ii)$4x^2 - 4ax + (a^2 - b^2) = 0$
7. Solve the quadratic equation $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0.$
8. Solve the quadratic equation $x^2 + 3x - (a^2 + a - 2) = 0.$
9. Solve the equation $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$
10. Solve the quadratic equation:
   $(i)\; 3ax^2 + 25x - 10\sqrt{5} = 0$
   (ii) $4\sqrt{3}\,x^2 + 5x - 2\sqrt{3} = 0$
   $(iii)\; 3x^2 - 2\sqrt{6}x + 2 = 0$
11. Solve the quadratic equation $\frac{a}{x-b} + \frac{b}{x-a} = 2, x \neq a, x \neq b.$
12. Solve the equation $\frac{a}{x-b} + \frac{b}{x-a} = \frac{2c}{x-c}, x \neq a, b, c.$
13. Solve the equation $3\left(\frac{3x-1}{2x+3}\right) - 2\left(\frac{2x+3}{3x-1}\right) = 5, \; x \neq -\frac{3}{2}, x \neq \frac{1}{3}.$
14. Solve the equation $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0.$
15. Quadratic formula with example $3x^2 + 2x - 1 = 0.$
16. Solve the quadratic equation
   (i) $3x^2 + 2\sqrt{5}x - 5 = 0$ (ii) $x^2 + 5x + 5 = 0$
17. Solve for x: $\frac{1}{x+1} + \frac{1}{x+2} = \frac{4}{x+4}$

18. Solve the quadratic equation $abx^2 + (b^2 - ac)x - bc = 0$
19. Solve for x: $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$
20. Find the root of the quadratic equation $x^2 + 5x - (\alpha + 1)(\alpha + 6) = 0$
21. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$. Find the value of k.
22. Find the value of k if roots are real and equal $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$.
23. Find the value of k if roots are real and equal $(k + 1)x^2 - 2(k - 1)x + 1 = 0$.
24. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, fmd the value of k.
25. Determine the positive value of k for which the equation $x^2 + kx + 4 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.
26. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal, then prove that $2b = a + c$.
27. If the roots of the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal then prove that $\frac{a}{b} = \frac{c}{d}$
28. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.
29. Find the value of k for which the roots of the equation $8kx\ (x - 1) + 1 = 0$ are real and equal.
30. Solve the quadratic equation for x: $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$.
31. If α *and* β are the roots of the quadratic equation $x^2 - x - 90 = 0$. Find value of $\frac{1}{\alpha} + \frac{1}{\beta}$.
32. Find the value of $\sqrt{12 + \sqrt{12 + \sqrt{12 + \cdots \infty}}}$
33. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then find the value of k.
34. Value(s) of k for which the quadratic equations $2x^2 - kx + k = 0$ has equal roots.