Q1. Find the roots of the following equations by factorisation :

(i) $6x^2 - x - 2 = 0$ (ii) $x^2 - 3x - 4 = 0$ (iii) $2x^2 - 19x + 35 = 0$ (iv) $2x^2 + x - 300 = 0$

Ans. 1   (i) $\frac{2}{3}, -\frac{1}{2}$ (ii) $4, -1$ (iii) $7, \frac{5}{2}$ (iv) $12, \frac{-25}{2}$

Q2. Find the discriminant of the following quadratic equations and hence find its nature of roots.

(i) $4x^2 - 6x + 3 = 0$ (ii) $2x^2 - 6x + 3 = 0$ (iii) $3x^2 - 2x + \frac{1}{3} = 0$ (iv) $3x^2 - 4\sqrt{3}x + 4 = 0$

(v) $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$

Ans.2 (i) $D = -12$ (ii) $D = 12$ (iii) $D = 0$ $(iv)\ D = 0$ (v) $D = 64$

Q3. Find the roots of the following equations by quadratic formula :

(i) $3x^2 - 5x + 2 = 0$ (ii) $2x^2 - 7x + 3 = 0$ (iii) $2x^2 - 2\sqrt{2}x + 1 = 0$ (iv) $4x^2 + 4\sqrt{3}x + 3 = 0$

(v) $x^2 - 4\sqrt{2}x + 6 = 0$ (vi) $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ (vii) $2x^2 + x - 4 = 0$

Ans.3   (i) $\frac{2}{3}, 1$ (ii) $\frac{1}{2}, 3$ (iii) $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$ (iv) $-\frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}$ (v) $3\sqrt{2}, \sqrt{2}$ (vi) $\frac{3}{4\sqrt{3}}, \frac{-2}{\sqrt{3}}$ (vii) $\frac{-1\pm\sqrt{33}}{4}$

Q4. Solve for x : (i) $x + \frac{1}{x} = 3$ (ii) $x - \frac{1}{x} = 3$ (iii) $\frac{1}{x} - \frac{1}{x-2} = 3$ (iv) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$ (v) $x + \frac{1}{x} = 5\frac{1}{5}$

(vi) $\frac{4}{x} - 3 = \frac{5}{2x+3}$ (vii) $\frac{16}{x} - 1 = \frac{15}{x+1}$ (viii) $\frac{x-4}{x-5} + \frac{x-6}{x-7} = \frac{10}{3}$ (ix) $\frac{x-2}{x-3} + \frac{x-4}{x-5} = \frac{10}{3}$

(x) $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2$ (xi) $\frac{5+x}{5-x} - \frac{5-x}{5+x} = 3\frac{3}{4}$ (xii) $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$

(xiii) $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ (xiv) $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$

(xv) $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$

Ans.4 (i) $\frac{3\pm\sqrt{5}}{2}$ (ii) $\frac{3\pm\sqrt{13}}{2}$ (iii) $\frac{3\pm\sqrt{3}}{3}$ (iv) $1, 2$ (v) $-5, -\frac{1}{5}$ (vi) $-2, 1$

(vii) $4, -4$ (viii) $8, \frac{11}{2}$ (ix) $6, \frac{7}{2}$ (x) $-2, -2$ (xi) $3, \frac{-25}{3}$ (xii) $-a, -b$

(xiii) $-a, -\frac{b}{2}$ $(xiv)\ 0, 4$ $(xv)\ 2 \pm 2\sqrt{3}$