



Exercise 10A

Question 33:

$$\begin{aligned}12abx^2 - (9a^2 - 8b^2)x - 6ab &= 0 \\ \Rightarrow 12abx^2 - 9a^2x + 8b^2x - 6ab &= 0 \\ \Rightarrow 3ax(4bx - 3a) + 2b(4bx - 3a) &= 0 \\ \Rightarrow (4bx - 3a)(3ax + 2b) &= 0 \\ \Rightarrow (4bx - 3a) = 0 \text{ or } (3ax + 2b) &= 0 \\ 4bx = 3a \text{ or } 3ax = -2b \\ x = \frac{3a}{4b}, x = \frac{-2b}{3a}\end{aligned}$$

Hence, $x=3a/4b$ and $x=-2b/3a$ are the roots of given equation.

Question 34:

$$\begin{aligned}4x^2 - 2(a^2 + b^2)x + a^2b^2 &= 0 \Rightarrow 4x^2 - 2a^2x - 2b^2x + a^2b^2 = 0 \\ \Rightarrow 2x(2x - a^2) - b^2(2x - a^2) &= 0 \\ \Rightarrow (2x - a^2)(2x - b^2) &= 0 \\ \Rightarrow (2x - a^2) = 0 \text{ or } (2x - b^2) &= 0 \\ x = \frac{a^2}{2} \text{ or } x = \frac{b^2}{2}\end{aligned}$$

Question 35:

$$\begin{aligned}
\frac{1}{x+4} - \frac{1}{(x-7)} &= \frac{11}{30} \Rightarrow \frac{(x-7) - (x+4)}{(x+4)(x-7)} = \frac{11}{30} \\
\Rightarrow \frac{x-7-x-4}{x^2-3x-28} &= \frac{11}{30} \Rightarrow \frac{-11}{x^2-3x-28} = \frac{11}{30} \\
\Rightarrow 11(x^2-3x-28) &= (30)(-11) \\
\Rightarrow x^2-3x-28 &= -30 \\
\Rightarrow x^2-3x-28+30 &= 0 \\
\Rightarrow x^2-3x+2 &= 0 \\
\Rightarrow x^2-2x-x+2 &= 0 \\
\Rightarrow x(x-2)-1(x-2) &= 0 \\
\Rightarrow (x-2)(x-1) &= 0 \\
(x-2) = 0 \text{ or } x-1 &= 0 \\
x = 2 \text{ or } x = 1
\end{aligned}$$

Hence, 2 and 1 are the roots of the given equation

Question 36:

$$\frac{1}{(x-3)} - \frac{1}{(x+5)} = \frac{1}{6}$$

$$\Rightarrow \frac{(x+5) - (x-3)}{(x-3)(x+5)} = \frac{1}{6}$$

$$\Rightarrow \frac{x+5-x+3}{(x-3)(x+5)} = \frac{1}{6}$$

$$\Rightarrow \frac{8}{x^2 + 2x - 15} = \frac{1}{6}$$

$$\Rightarrow x^2 + 2x - 15 = 48$$

$$\Rightarrow x^2 + 2x - 15 - 48 = 0$$

$$\Rightarrow x^2 + 2x - 63 = 0$$

$$\Rightarrow x^2 + 9x - 7x - 63 = 0$$

$$\Rightarrow x(x+9) - 7(x+9) = 0$$

$$\Rightarrow (x+9)(x-7) = 0$$

$$\Rightarrow x+9 = 0 \quad \text{or} \quad x-7 = 0$$

$$x = -9 \quad \text{or} \quad x = 7$$

Hence, -9 and 7 are the roots of the given equation

Question 37:

$$\frac{(x-3)}{(x+3)} - \frac{(x+3)}{(x-3)} = 6 \frac{6}{7}$$

$$\Rightarrow \frac{(x-3)^2 - (x+3)^2}{(x+3)(x-3)} = \frac{48}{7}$$

$$\Rightarrow \frac{(x^2 + 9 - 6x) - (x^2 + 9 + 6x)}{(x+3)(x-3)} = \frac{48}{7}$$

$$\Rightarrow \frac{-12x}{x^2 - 9} = \frac{48}{7}$$

$$\Rightarrow -84x = 48x^2 - 432$$

$$\Rightarrow 48x^2 + 84x - 432 = 0$$

$$\Rightarrow 4x^2 + 7x - 36 = 0$$

$$\Rightarrow 4x^2 + 16x - 9x - 36 = 0$$

$$\Rightarrow 4x(x+4) - 9(x+4) = 0$$

$$\Rightarrow (4x - 9)(x + 4) = 0$$

$$4x - 9 = 0 \quad \text{or} \quad x + 4 = 0$$

$$x = \frac{9}{4} \quad \text{or} \quad x = -4$$

Hence, -4 and $x=9/4$ are the roots of the given equation

Question 38:

$$\begin{aligned}
& \frac{2x}{(x-4)} + \frac{(2x-5)}{(x-3)} = \frac{25}{3} \\
\Rightarrow & \frac{2x(x-3) + (2x-5)(x-4)}{(x-4)(x-3)} = \frac{25}{3} \\
\Rightarrow & \frac{2x^2 - 6x + 2x^2 - 8x - 5x + 20}{x^2 - 4x - 3x + 12} = \frac{25}{3} \\
\Rightarrow & \frac{4x^2 - 19x + 20}{x^2 - 7x + 12} = \frac{25}{3} \\
\Rightarrow & 3(4x^2 - 19x + 20) = 25(x^2 - 7x + 12) \\
\Rightarrow & 12x^2 - 57x + 60 = 25x^2 - 175x + 300 \\
\Rightarrow & 12x^2 - 25x^2 - 57x + 175x + 60 - 300 = 0 \\
\Rightarrow & -13x^2 + 118x - 240 = 0 \\
\Rightarrow & 13x^2 - 78x - 40x + 240 = 0 \\
\Rightarrow & 13x(x-6) - 40(x-6) = 0 \\
\Rightarrow & (13x-40)(x-6) = 0 \\
& 13x-40=0 \quad \text{or} \quad x-6=0 \\
& x = \frac{40}{13} \quad \text{or} \quad x = 6
\end{aligned}$$

Hence 40/13 and 6 are the roots of the given equation

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