

(a) solution by completing square :-

Exp: $x^2 + 4x - 437 = 0$ solve the given eqn?

Sol: $x^2 + 4x - 437 = 0$

$$\begin{aligned} x^2 + 4x + 2^2 &= 437 + (2)^2 \\ (x+2)^2 &= 437 + 4 \end{aligned}$$

$$\begin{aligned} (x+2)^2 &= 441 \\ \sqrt{(x+2)^2} &= \sqrt{441} \\ (x+2) &= \pm \sqrt{441} \\ (x+2) &= \pm 21 \end{aligned}$$

$$x+2 = 21$$

$$x = 21 - 2$$

$$x = 19$$

$$x+2 = -21$$

$$x = -21 - 2$$

$$x = -23$$

$$\text{root} = \{19, -23\}$$

(2) $x^2 - 6x - 1 = 0$

(1) $x^2 - 6x = 1$

(2) $x^2 - 6x + 3^2 = 1 + (3)^2$
 $(x-3)^2 = 1 + 9$

(4) $\frac{(x-3)^2}{6} = 11$
 $\sqrt{(x-3)^2} = \sqrt{11}$
 $(x-3) = \pm \sqrt{11}$

(5) $x-3 = \sqrt{11}$ or $x-3 = -\sqrt{11}$

$$x = \sqrt{11} + 3$$

$$x = -\sqrt{11} + 3$$

$$\begin{aligned} \sqrt{(a+b)^2} &= a^2 + b^2 + 2ab \\ \sqrt{(a-b)^2} &= a^2 + b^2 - 2ab \end{aligned}$$

$$\begin{aligned} \sqrt{(x+2)^2} &= x^2 + (2)^2 + 2(x)(2) \\ &= x^2 + 4 + 4x \end{aligned}$$

$$2^2 = 2 \times 2 = 4$$

$$2^3 = 2 \times 2 \times 2 = 8$$

$$\sqrt{(21)^2}$$

$$\begin{aligned} \sqrt{x^2} &= |x| \\ &= \pm x \end{aligned}$$

$$\begin{aligned} (a-b)^2 &= a^2 + b^2 - 2ab \\ &= x^2 + (3)^2 - 2 \times 3 \\ (x-3)^2 &= x^2 + 9 - 6x \end{aligned}$$

$$(3) \quad 3x^2 - 5x + 1 = 0$$

Sol:-

$$3x^2 - 5x = -1$$

$$(1) \quad \frac{3x^2}{3} - \frac{5x}{3} = \frac{-1}{3}$$

$$x^2 - \frac{5}{3}x = \frac{-1}{3}$$

$$(2) \quad x^2 - \frac{5}{3}x + \left(\frac{5}{6}\right)^2 = \frac{-1}{3} + \left(\frac{5}{6}\right)^2$$

$$\left(x - \frac{5}{6}\right)^2 = \frac{-1}{3} + \frac{25}{36}$$

$$= \frac{13}{36} = \frac{-12 + 25}{36} = \frac{13}{36}$$

$$(3) \quad \sqrt{\left(x - \frac{5}{6}\right)^2} = \sqrt{\frac{13}{36}}$$

$$\left(x - \frac{5}{6}\right) = \pm \frac{\sqrt{13}}{6}$$

$$(4) \quad x - \frac{5}{6} = \frac{\sqrt{13}}{6}$$

$$x = \frac{\sqrt{13}}{6} + \frac{5}{6}$$

$$x - \frac{5}{6} = \frac{-\sqrt{13}}{6}$$

$$x = \frac{-\sqrt{13}}{6} + \frac{5}{6}$$

$$\begin{aligned} (a-b)^2 &= a^2 + b^2 - 2ab \\ &= x^2 + \left(\frac{5}{6}\right)^2 - 2 \cdot x \cdot \left(\frac{5}{6}\right) \\ \left(x - \frac{5}{6}\right)^2 &= x^2 + \left(\frac{5}{6}\right)^2 - \frac{25}{3} \end{aligned}$$

$$x \cdot x \frac{5}{6} = \frac{5}{3} x$$

3	36	3
12	12	1
	1	1

$$3 \times 12 = 36$$

