

# Unit 3 – 3

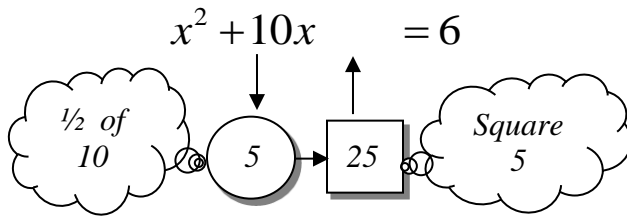
## BASIC

$$x^2 + 10x - 6 = 0$$

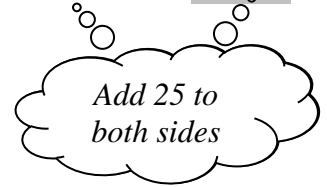
$$x^2 + 10x - 6 = 0$$

$$\begin{array}{r} +6 \quad +6 \\ \hline \end{array}$$

Move constant to the other side



$$x^2 + 10x + 25 = 6 + 25$$



$$x^2 + 10x + 25 = 31 \quad \text{Easily Factors}$$

$$(x + 5)(x + 5) = 31 \quad \text{Can be re-written}$$

$$(x + 5)^2 = 31 \quad \text{Take the square root of both sides}$$

$$\sqrt{(x + 5)^2} = \sqrt{31} \quad \text{Don't forget } \pm$$

$$x + 5 = \pm\sqrt{31}$$

$$\begin{array}{r} -5 \quad -5 \\ \hline \end{array}$$

Isolate x

$$x = -5 \pm \sqrt{31} \quad \text{OR} \quad x \approx 0.5678 \quad \text{or} \quad -10.5678$$

## INTERMEDIATE

$$3x^2 - 15x + 9 = 0$$

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$$\begin{array}{r} -9 \quad -9 \\ \hline \end{array}$$

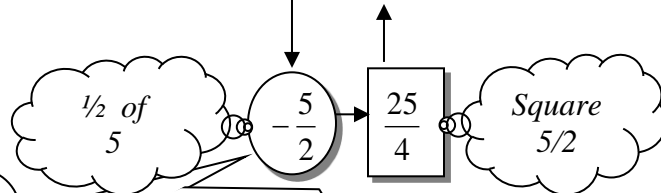
Move constant to the other side

$$3x^2 - 15x = -9$$

Divide both sides by the leading coefficients

$$\frac{3x^2 - 15x}{3} = \frac{-9}{3}$$

$$x^2 - 5x = -3 \longrightarrow x^2 - 5x + \frac{25}{4} = -\frac{3}{1} + \frac{25}{4}$$



Notice  $-\frac{5}{2}$  it is the number that when added to itself is equal to  $-5$  and when multiplied by itself is equal to  $\frac{25}{4}$ .

$$\left(x - \frac{5}{2}\right)\left(x - \frac{5}{2}\right) = -\frac{12}{4} + \frac{25}{4} \longrightarrow \left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$$

$$\sqrt{\left(x - \frac{5}{2}\right)^2} = \pm\sqrt{\frac{13}{4}}$$

$$x - \frac{5}{2} = \pm\frac{\sqrt{13}}{2}$$

$$x = \frac{5}{2} \pm \frac{\sqrt{13}}{2}$$

$$x = \frac{5 \pm \sqrt{13}}{2}$$

$$x \approx 0.6972 \quad \text{or} \quad -4.3028$$

Solve the following by completing the square.

1.  $x^2 + 10x - 19 = 0$

2.  $x^2 - 12x + 2 = 0$

3.  $x^2 + 12x - 8 = 0$

4.  $x^2 - 5x - 4 = 0$

5.  $2x^2 - 8x - 14 = 0$

6.  $3x^2 - 18x - 5 = 0$

Solve the following by completing the square.

7.  $2x^2 - 16x - 3 = 0$

8.  $2x^2 - 10x - 6 = 0$

9.  $2x^2 - 5x - 12 = 0$

10.  $4x^2 - 10x - 8 = 0$