

Solving Trinomials by completing the square. (Notes)

Example 1)

$$\begin{array}{r} \bullet x^2 + 4x - 5 = 0 \\ + 5 + 5 \end{array}$$

$$\Rightarrow x^2 + 4x = 5$$

$$\Rightarrow x^2 + 4x + \left(\frac{4}{2}\right)^2 = 5 + \left(\frac{4}{2}\right)^2$$

$$\Rightarrow \sqrt{(x+2)^2} = \sqrt{5+4}$$

$$\Rightarrow (x+2) = \pm\sqrt{9}$$

$$x = -2 \pm 3 \Rightarrow x = 1 \text{ or } x = -5.$$

⊙ Add $\left(\frac{b}{2}\right)^2$ both sides

Example 2)

$$\bullet 3x^2 - 12x = 6$$

⊙ Divide 3 to the Equation.

$$\Rightarrow \frac{3x^2}{3} - \frac{12x}{3} = \frac{6}{3}$$

$$\Rightarrow x^2 - 4x = 2$$

$$\Rightarrow x^2 - 4x + \left(\frac{-4}{2}\right)^2 = 2 + \left(\frac{-4}{2}\right)^2$$

$$\Rightarrow \sqrt{(x-2)^2} = \sqrt{2+4}$$

$$\Rightarrow x-2 = \pm\sqrt{6}$$

$$x = 2 \pm\sqrt{6}$$

⊙ Add $\left(\frac{b}{2}\right)^2$ both sides.