Solving By Completing the Square

Solve: $2(x-3)^2 + 9 = 26$

$2(x-3)^2 = 17$ Subtract 9 from each side.

$(x-3)^2 = 8.5$ Divide each side by 2.

$x-3 = \pm\sqrt{8.5}$ Square root each side. You will get both a positive and negative root.

$x = 3 \pm\sqrt{8.5}$ Add 3 to each side.

$x = 3 -\sqrt{8.5}$ and $x = 3 +\sqrt{8.5}$ There are two answers: one with $+\sqrt{}$ and one with $-\sqrt{}$

$x \approx 0.085$ and $x \approx 5.915$ You can write the answers as decimals.

Complete the square and set y = 0 to solve the equation: $y = x^2 - 4x + 1$

$y = (x^2 - 4x + \underline{}) + 1 - \underline{}$

Re-write the equation with 2 blanks.

$y = (x^2 - 4x + \underline{(-2)^2}) + 1 - \underline{(-2)^2}$

Fill in each blank with $\left(\frac{b}{2}\right)^2$

$y = (x - 2)^2 - 3$

Factor the perfect square trinomial and combine like terms.

$(x - 2)^2 - 3 = 0$

Set y = 0.

$(x - 2)^2 = 3$

Add 3 to both sides.

$x - 2 = \pm\sqrt{3}$

Square root each side. You will get both a positive and negative root.

$x = 2 \pm\sqrt{3}$

Add 2 to both sides.

$x = 2 - \sqrt{3}$ and $x = 2 + \sqrt{3}$

There are two answers: one with $+\sqrt{}$ and one with $-\sqrt{}$

Use completing the square to determine the values of x where: $4x^2 - 4x - 8 = -12x + 1$

$4x^2 + 8x - 9 = 0$

Bring all terms to one side of the equal sign.

$y = 4x^2 + 8x - 9$

Write as y =

$\frac{1}{4}y = x^2 + 2x - 2.25$

Divide everything by a.

$\frac{1}{4}y = (x^2 + 2x + \underline{\quad}) - 2.25 - \underline{\quad}$

Re-write the equation with 2 blanks.

$\frac{1}{4}y = (x^2 + 2x + \underline{(1)^2}) - 2.25 - \underline{(1)^2}$

Fill in each blank with $\left(\frac{b}{2}\right)^2$

$\frac{1}{4}y = (x + 1)^2 - 3.25$

Factor the perfect square trinomial and combine like terms.

$y = 4(x + 1)^2 - 13$

Multiply each term by a.

$$4(x + 1)^2 - 13 = 0$$

Set y = 0.

$$4(x + 1)^2 = 13$$

Add 13 to each side.

$$4(x + 1)^2 = 3.25$$

Divide each side by 4.

$$x + 1 = \pm\sqrt{3.25}$$

Square root each side. You will get both a positive and negative root.

$$x = -1 \pm\sqrt{3.25}$$

Subtract 1 from each side.

$$x = -1 - \sqrt{3.25} \text{ and } x = -1 + \sqrt{3.25}$$

There are two answers: one with $+\sqrt{}$ and one with $-\sqrt{}$