

Algebra 1 9.4 *build*
↓
Complete the square to write perfect square trinomials
Solve equations by completing the square
trinomial
perfect square trinomial
quadratic term
linear term
constant term

matching activity

Complete the square. Write in factored form.

16. $x^2 - 22x + 121$

$$(x-11)^2$$

17. $x^2 - 15x + \frac{225}{4}$

$$\left(x - \frac{15}{2}\right)^2$$

$$\frac{15}{2} \cdot \frac{15}{2}$$

18. $x^2 + 24x + 144$

$$(x+12)^2$$

Example 2 Solve an Equation by Completing the Square

Solve $x^2 - 6x + 12 = 19$ by completing the square.

$$x^2 - 6x + 9 = 7 + 9$$

$$\sqrt{(x-3)^2} = \sqrt{16}$$

$$x-3 = \pm 4$$

$$\begin{array}{r} x-3=4 \\ +3 \quad +3 \\ \hline x=7 \end{array}$$

$$\begin{array}{r} x-3=-4 \\ +3 \quad +3 \\ \hline x=-1 \end{array}$$

What do I need to build a perfect square?

What has to happen (to both sides)?

Write in factored form

Guided Practice

$$(\quad) \cdot (\quad) = 0$$

2. Solve $x^2 - 12x + 3 = 8$ by completing the square.
 $-3 \quad -3$

$$x^2 - 12x + 36 = 5 + 36$$

$$\sqrt{(x-6)^2} = \sqrt{41}$$

$$x-6 = \begin{matrix} + \\ - \end{matrix} 6.4$$

$$x-6 = 6.4$$
$$\begin{matrix} +6 & +6 \\ x & = 12.4 \end{matrix}$$

$$x-6 = -6.4$$
$$\begin{matrix} +6 & +6 \\ x & = -0.4 \end{matrix}$$

Clear the construction zone.
What else do I need to build a perfect square?
What has to happen (to both sides)?
Write in factored form.
Solve.

~~$x^2 + 4x + 6 = 0$~~
 $x^2 + 4x + 6 = 0$
 Solve each equation by completing the square. Round to the nearest tenth if necessary.

5. $x^2 + 4x = 6$

$(\quad)(\quad) = 0$ $+16$ $+16$

6. $x^2 - 8x = -9$

$x^2 + 4x + 4 = 6 + 4$ $(x - 4)^2 = 7$

$\sqrt{(x + 2)^2} = \sqrt{10}$

$x + 2 = \pm \sqrt{10}$

$x + 2 = 3.2$
 $\frac{-2 \quad -2}{x = 1.2}$

$x - 4 = \pm \sqrt{7}$
 $x - 4 = \pm 2.6$

$x - 4 = 2.6$
 $\frac{+4 \quad 4}{6.6}$

$x - 4 = -2.6$
 $\frac{+4 \quad +4 \quad 6}{1.4}$

What do I need to build a perfect square?

What has to happen (to both sides)?

Write in factored form

19 $x^2 + 6x - 16 = 0$



$$x^2 + 6x + 9 = 16 + 9$$

$$(x+3)^2 = 25$$

$$x+3 = \pm 5$$

$$x+3 = 5$$

$$x+3 = -5$$

20. $x^2 - 2x - 14 = 0$

$$x^2 - 2x + 1 = 14 + 1$$

$$(x-1)^2 = 15$$

$$x-1 = \pm\sqrt{15}$$

$$x-1 = 3.9$$

$$\begin{array}{r} +1 \quad +1 \\ \hline 4.9 \end{array}$$

$$x-1 = -3.9$$

$$\begin{array}{r} +1 \quad +1 \\ \hline x = -2.9 \end{array}$$

What do I need to build a perfect square?

What has to happen (to both sides)?

Write in factored form

$$21. x^2 - 8x - 1 = 8$$

$$x + \frac{3}{2} = 1.8 \\ = 0.3$$

$$x + \frac{3}{2} = -1.8 \\ = -3.3$$

$$22. x^2 + 3x + 21 = 22$$

-21 -21

$$x^2 + 3x + \frac{9}{4} = \frac{4}{4} + \frac{9}{4}$$

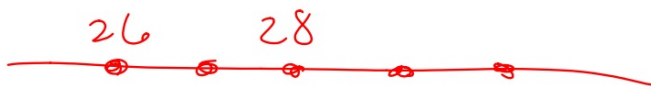
$$\sqrt{\left(x + \frac{3}{2}\right)^2} = \sqrt{\frac{13}{4}}$$

$$x + \frac{3}{2} = \pm \frac{\sqrt{13}}{2}$$

$$x + \frac{3}{2} = \pm 1.8$$

$$23 \quad x^2 - 11x + 3 = 5$$

$$(e)(e+2) = 728$$



$$\begin{array}{cc} e & e+2 \\ -28 & -26 \\ e^2 + 2e+1 = 728+1 \end{array}$$

$$\begin{array}{cc} e+1 = 27 & e = 26 \\ -1 & -1 \end{array}$$

$$(e+1)^2 = 729$$

$$e+1 = \pm 27$$

$$\begin{array}{cc} e+1 = -27 & e = -28 \\ -1 & -1 \end{array}$$