

LESSON
9-2

Solving Equations by Completing the Square

Reteach

To solve a quadratic equation, complete the square. Here is an example.

Solve $x^2 + 10x = -24$.

Leave room for adding **a number** to each side of the equation.

$$x^2 + 10x + \underline{\hspace{2cm}} = -24 + \underline{\hspace{2cm}}$$

What number?

Answer: The square of one half of 10, the coefficient of x

$$\left(\frac{1}{2} \times 10\right)^2 = 5^2 = 25$$

Now fill in the blanks with this number.

$$x^2 + 10x + \underline{25} = -24 + \underline{25}$$

$$x^2 + 10x + 25 = 1$$

$x^2 + 10x + 25$ is a perfect square trinomial. It equals $(x + 5)^2$.

Now you have a **simpler equation** to work with.

$$(x + 5)^2 = 1$$

$$\sqrt{(x + 5)^2} = \pm\sqrt{1}$$

$$x + 5 = \pm 1$$

Remember \pm .
There are two square roots.

Finish.

$$\begin{array}{l} \downarrow \\ x + 5 = 1 \\ x = -4 \end{array} \qquad \begin{array}{l} \downarrow \\ x + 5 = -1 \\ x = -6 \end{array}$$

Two equations to solve.

The solutions are -4 and -6 .

Solve by completing the square.

1. $x^2 - 6x = 7$

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

3. $x^2 - 2x = 63$

4. $x^2 + 4x = 32$

5. $x^2 - 14x = -24$

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

7. The product of two consecutive positive integers is 56. What are they?
