EXAMPLE 4 Solve $ax^2 + bx + c = 0$ when $a \neq 1$

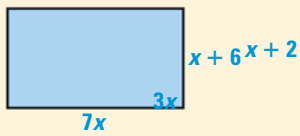
Solve $2x^2 + 8x + 14 = 0$ by completing the square.

$2x^2 + 8x + 14 = 0$	Write original equation.
$x^2 + 4x + 7 = 0$	Divide each side by the coefficient of x^2.
$x^2 + 4x = -7$	Write left side in the form $x^2 + bx$.
$x^2 + 4x + 4 = -7 + 4$	Add $\left(\frac{4}{2}\right)^2 = 2^2 = 4$ to each side.
$(x + 2)^2 = -3$	Write left side as a binomial squared.
$x + 2 = \pm\sqrt{-3}$	Take square roots of each side.
$x = -2 \pm \sqrt{-3}$	Solve for x.
$x = -2 \pm i\sqrt{3}$	Write in terms of the imaginary unit i.

▶ The solutions are $-2 + i\sqrt{3}$ and $-2 - i\sqrt{3}$.

EXAMPLE 5 TAKS PRACTICE: Multiple Choice

The area of the rectangle shown is 112 square units. What is the value of x?



Ⓐ -8 Ⓑ 2

Ⓒ 10.6 Ⓓ -8 or 2

ELIMINATE CHOICES
You can eliminate choices A and D because the side lengths are negative when $x = -8$.

Solution

Use the formula for the area of a rectangle to write an equation.

$7x(x + 6) = 112$	Length × Width = Area
$7x^2 + 42x = 112$	Distributive property
$x^2 + 6x = 16$	Divide each side by the coefficient of x^2.
$x^2 + 6x + 9 = 16 + 9$	Add $\left(\frac{6}{2}\right)^2 = 3^2 = 9$ to each side.
$(x + 3)^2 = 25$	Write left side as a binomial squared.
$x + 3 = \pm 5$	Take square roots of each side.
$x = -3 \pm 5$	Solve for x.

So, $x = -3 + 5 = 2$ or $x = -3 - 5 = -8$. You can reject $x = -8$ because the side lengths would be -56 and -2, and side lengths cannot be negative.

▶ The value of x is 2. The correct answer is B. Ⓐ Ⓑ Ⓒ Ⓓ

GUIDED PRACTICE for Examples 3, 4, and 5

Solve the equation by completing the square.

7. $x^2 + 6x + 4 = 0$ **8.** $x^2 - 10x + 8 = 0$ **9.** $2n^2 - 4n - 14 = 0$

10. $3x^2 + 12x - 18 = 0$ **11.** $6x(x + 8) = 12$ **12.** $4p(p - 2) = 100$