10.6 Solve Quadratic Equations by the Quadratic Formula

Before	You solved quadratic equations by completing the square.
Now	You will solve quadratic equations using the quadratic formula.
Why?	So you can solve a problem about film production, as in Example 3.

Key Vocabulary
• quadratic formula

By completing the square for the quadratic equation $ax^2 + bx + c = 0$, you can develop a formula that gives the solutions of any quadratic equation in standard form. This formula is called the **quadratic formula**. (The quadratic formula is developed on page 727.)

KEY CONCEPT
For Your Notebook

The Quadratic Formula

The solutions of the quadratic equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ where $a \neq 0$ and $b^2 - 4ac \geq 0$.

TAKS

EXAMPLE 1   TAKS PRACTICE: Multiple Choice

What are the solutions of $4x^2 + 7x = 15$?

(A) $-\frac{5}{4}$ and -3 (B) $\frac{5}{4}$ and -3 (C) $-\frac{5}{4}$ and 3 (D) $\frac{5}{4}$ and 3

ANOTHER WAY

Instead of solving the equation, you can check the answer choices in the equation.

Solution

$4x^2 + 7x = 15$	Write original equation.
$4x^2 + 7x - 15 = 0$	Write in standard form.
$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Quadratic formula
$x = \dfrac{-7 \pm \sqrt{7^2 - 4(4)(-15)}}{2(4)}$	Substitute values in the quadratic formula: $a = 4$, $b = 7$, and $c = -15$.
$= \dfrac{-7 \pm \sqrt{289}}{8}$	Simplify.
$= \dfrac{-7 \pm 17}{8}$	Simplify the square root.

The solutions of the equation are $\dfrac{-7 + 17}{8} = \dfrac{5}{4}$ and $\dfrac{-7 - 17}{8} = -3$.

▶ The correct answer is B. (A) (B) (C) (D)