2.4 Algebraic Reasoning
For use with Exploration 2.4

Essential Question   How can algebraic properties help you solve an equation?

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1 EXPLORATION: Justifying Steps in a Solution

Work with a partner. In previous courses, you studied different properties, such as the properties of equality and the Distributive, Commutative, and Associative Properties. Write the property that justifies each of the following solution steps.

Algebraic Step	**Justification**
$2(x + 3) - 5 = 5x + 4$	Write given equation.
$2x + 6 - 5 = 5x + 4$	_____
$2x + 1 = 5x + 4$	_____
$2x - \mathbf{2x} + 1 = 5x - \mathbf{2x} + 4$	_____
$1 = 3x + 4$	_____
$1 - \mathbf{4} = 3x + 4 - \mathbf{4}$	_____
$-3 = 3x$	_____
$\dfrac{-3}{\mathbf{3}} = \dfrac{3x}{\mathbf{3}}$	_____
$-1 = x$	_____
$x = -1$	_____

2.4 **Notetaking with Vocabulary** (continued)

Extra Practice

In Exercises 1–3, solve the equation. Justify each step.

   1. $3x - 7 = 5x - 19$

   2. $20 - 2(3x - 1) = x - 6$

   3. $-5(2u + 10) = 2(u - 7)$

In Exercises 4 and 5, solve the equation for the given variable. Justify each step.

   4. $9x + 2y = 5; y$

   5. $\dfrac{1}{15}s - \dfrac{2}{3}t = -2; s$

   6. The formula for the surface area S of a cone is $S = \pi r^2 + \pi rs,$ where r is the radius and s is the slant height. Solve the formula for $s.$ Justify each step. Then find the slant height of the cone when the surface area is 220 square feet and the radius is 7 feet. Approximate to the nearest tenth.