CHAPTER 11: RADICAL EXPRESSIONS

11.1 Simplifying Radical Expressions

OBJECTIVES

❏ I can simplify radical expressions

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

Radical expressions like $2\sqrt{3}$ and $\sqrt{x+3}$ contain a radical. You read $\sqrt{x+3}$ as "the square root of the quantity x plus three." You can simplify a radical expression by removing perfect-square factors from the radicand. Recall that a radicand is the quantity or expression under the radical sign.

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

Property	Multiplication Property of Square Roots

For every number $a \geq 0$ and $b \geq 0$, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$.

Example $\sqrt{54} = \sqrt{9} \cdot \sqrt{6} = 3 \cdot \sqrt{6} = 3\sqrt{6}$

Property	Division Property of Square Roots

For every number $a \geq 0$ and $b > 0$, $\sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$.

Example $\sqrt{\dfrac{16}{25}} = \dfrac{\sqrt{16}}{\sqrt{25}} = \dfrac{4}{5}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

You can use the Multiplication Property of Square Roots to simplify radical expressions by rewriting the radicand as a product of the perfect-square factors times the remaining factors.

1 Simplify each radical expression.

a. $\sqrt{50}$ **b.** $-5\sqrt{300}$ **c.** $\sqrt{18}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

2 Simplify each radical expression.

a. $\sqrt{27n^2}$ **b.** $-a\sqrt{60a^7}$ **c.** $\sqrt{x^2y^5}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

3 Simplify each radical expression.

a. $\sqrt{13} \cdot \sqrt{52}$ **b.** $5\sqrt{3c} \cdot \sqrt{6c}$ **c.** $2\sqrt{5a^2} \cdot 6\sqrt{10a^3}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

5 Simplify each radical expression.

a. $\sqrt{\dfrac{144}{9}}$ **b.** $\sqrt{\dfrac{25p^3}{q^2}}$ **c.** $\sqrt{\dfrac{75}{16t^2}}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

6 Simplify each radical expression.

a. $\sqrt{\dfrac{90}{5}}$
b. $\sqrt{\dfrac{48}{75}}$
c. $\sqrt{\dfrac{27x^3}{3x}}$

PART 1: SIMPLIFYING RADICAL EXPRESSIONS

A radicand in the denominator of a radical expression may not be a perfect square. To simplify, you may need to **rationalize** the denominator. To do this, you multiply the numerator and the denominator by the same radical expression. You choose a radical expression that will make the denominator a perfect square.

7 Simplify by rationalizing the denominator.

a. $\dfrac{3}{\sqrt{3}}$
b. $\dfrac{\sqrt{5}}{\sqrt{18t}}$
c. $\sqrt{\dfrac{7m}{10}}$

CAN YOU?? PROVE IT!!

❑ I can simplify radical expressions
  ❑ Go back and finish all the blank problems ☺

Summary	**Simplest Radical Form**

A radical expression is in simplest radical form when all three statements are true.
- The radicand has no perfect-square factors other than 1.
- The radicand has no fractions.
- The denominator of a fraction has no radical.