11.2 Simplify Radical Expressions

TEKS A.4.A, A.4.B; 2A.2.A

Before	You found square roots.
Now	You will simplify radical expressions.
Why?	So you can find the distance to the horizon, as in Ex. 68.

Key Vocabulary
- simplest form of a radical expression
- rationalizing the denominator

A radical expression is in **simplest form** if the following conditions are true:

- No perfect square factors other than 1 are in the radicand.
- No fractions are in the radicand.
- No radicals appear in the denominator of a fraction.

You can use the following property to simplify radical expressions.

KEY CONCEPT *For Your Notebook*

Product Property of Radicals

Words The square root of a product equals the product of the square roots of the factors.

Algebra $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ where $a \geq 0$ and $b \geq 0$

Example $\sqrt{4x} = \sqrt{4} \cdot \sqrt{x} = 2\sqrt{x}$

You can also use the fact that $\sqrt{a^2} = a$, where $a \geq 0$, to simplify radical expressions. In this lesson, whenever a variable appears in the radicand *assume that it has only nonnegative values.*

EXAMPLE 1 Use the product property of radicals

a. $\sqrt{32} = \sqrt{16 \cdot 2}$ **Factor using perfect square factor.**

$= \sqrt{16} \cdot \sqrt{2}$ **Product property of radicals**

$= 4\sqrt{2}$ **Simplify.**

b. $\sqrt{9x^3} = \sqrt{9 \cdot x^2 \cdot x}$ **Factor using perfect square factors.**

$= \sqrt{9} \cdot \sqrt{x^2} \cdot \sqrt{x}$ **Product property of radicals**

$= 3x\sqrt{x}$ **Simplify.**

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✓ **GUIDED PRACTICE** for Example 1

1. Simplify (**a**) $\sqrt{24}$ and (**b**) $\sqrt{25x^2}$.