Algebra I

Notes 13.2, Part 2 Simplifying Radical Products and Fractions

Objective: Simplify a product of radicals or a radical fraction.

Consider: $\sqrt{36} =$

$\sqrt{36} = \sqrt{4 \cdot 9} = \sqrt{4} \cdot \sqrt{9} = \quad \cdot \quad =$

$\sqrt{100} =$

$\sqrt{100} = \sqrt{4 \cdot 25} = \sqrt{4} \cdot \sqrt{25} = \quad \cdot \quad =$

$\sqrt{144} =$

$\sqrt{144} = \sqrt{9 \cdot 16} = \sqrt{9} \cdot \sqrt{16} = \quad \cdot \quad =$

The above examples illustrate the *Multiplication Property of Square Roots.*

Multiplication Property of Square Roots
$\sqrt{a} \cdot \sqrt{b} = \sqrt{a \cdot b}$ (if a and $b \geq 0$)

Use the following examples to verify the *Multiplication Property of Square Roots.*

1. $\sqrt{576} = \sqrt{144 \cdot 4} = \sqrt{144} \cdot \sqrt{4} = \quad \cdot \quad =$ on a calculator $\sqrt{576} =$
2. $\sqrt{784} = \sqrt{49 \cdot 16} = \sqrt{49} \cdot \sqrt{16} = \quad \cdot \quad =$ on a calculator $\sqrt{784} =$
3. $\sqrt{3136} = \sqrt{49 \cdot 64} = \sqrt{49} \cdot \sqrt{64} = \quad \cdot \quad =$ on a calculator $\sqrt{3136} =$

Evaluate WITHOUT a calculator:

4. $\sqrt{400} = \sqrt{4 \cdot 100} = \sqrt{4} \cdot \sqrt{100} = \quad \cdot \quad =$
5. $\sqrt{400} = \sqrt{25 \cdot 16} = \sqrt{25} \cdot \sqrt{16} = \quad \cdot \quad =$
6. $\sqrt{196} = \sqrt{49 \cdot 4} = \sqrt{49} \cdot \sqrt{4} = \quad \cdot \quad =$
7. $\sqrt{8100} = \sqrt{81 \cdot 100} = \sqrt{81} \cdot \sqrt{100} = \quad \cdot \quad =$
8. $\sqrt{900} = \sqrt{9 \cdot 100} = \sqrt{9} \cdot \sqrt{100} = \quad \cdot \quad =$
9. $\sqrt{900} = \sqrt{25 \cdot 36} = \sqrt{25} \cdot \sqrt{36} = \quad \cdot \quad =$

Use the *Multiplication Property of Square Roots* to simplify the following:

1. $\sqrt{2} \cdot \sqrt{8} = \sqrt{} =$ 2. $\sqrt{4} \cdot \sqrt{16} = \sqrt{} =$ 3. $\sqrt{2} \cdot \sqrt{50} = \sqrt{} =$

4. $\sqrt{3} \cdot \sqrt{27} = \sqrt{} =$ 5. $\sqrt{2} \cdot \sqrt{72} = \sqrt{} =$ 6. $\sqrt{2} \cdot \sqrt{18} = \sqrt{} =$

Use the *Multiplication Property of Square Roots* to evaluate these radical products:

$\sqrt{3} \cdot \sqrt{3} = \sqrt{} =$ $\sqrt{4} \cdot \sqrt{4} = \sqrt{} =$ $\sqrt{5} \cdot \sqrt{5} = \sqrt{} =$

$\sqrt{9} \cdot \sqrt{9} = \sqrt{} =$ $\sqrt{7} \cdot \sqrt{7} = \sqrt{} =$ $\sqrt{6} \cdot \sqrt{6} = \sqrt{} =$

Use the above pattern to complete the following: $\sqrt{a} \cdot \sqrt{a} = \sqrt{ \cdot } = \sqrt{} =$ (if $a \geq 0$)

Division Property of Square Roots

$$\frac{\sqrt{a}}{\sqrt{b}} =$$

(for $a \geq 0$, $b > 0$)

Use the *Division Property of Square Roots* to simplify the following:

1. $\frac{\sqrt{32}}{\sqrt{2}} =$ 2. $\frac{\sqrt{12}}{\sqrt{3}} =$ 3. $\frac{\sqrt{162}}{\sqrt{2}} =$ 4. $\frac{\sqrt{225}}{\sqrt{25}} =$

5. $\sqrt{\frac{4}{9}} =$ 6. $\sqrt{\frac{x^2}{49}} =$ 7. $\sqrt{\frac{25}{144}} =$ 8. $\sqrt{\frac{64}{121}} =$

Use *properties of fractions* and the *Division Property of Square Roots* to simplify the following:

1. $\frac{\sqrt{700}}{\sqrt{900}} =$ 2. $\sqrt{\frac{11}{36}} =$ 3. $\frac{\sqrt{48}}{\sqrt{4}} =$

Does $\sqrt{a + b} = \sqrt{a} + \sqrt{b}$?

Try $\sqrt{100} = \sqrt{36 + 64}$?=? $\sqrt{36} + \sqrt{64} = + = $?=? $\sqrt{100}$

Does $\sqrt{a - b} = \sqrt{a} - \sqrt{b}$?

Try $\sqrt{64} = \sqrt{100 - 36}$?=? $\sqrt{100} - \sqrt{36} = - =$?=? $\sqrt{64}$

A ____________ or a __________________ CANNOT be separated under a radical sign;

only a ________________ or a _________________ can be separated under a radical sign.