

Warm up: p. 547

# 7 - 15

**OBJECTIVE:** You will learn to multiply, divide and simplify radical expressions.

Section 13-1

1-23-12

perfect squares --

4, 16, 25  
2·2, 4·4, 5·5

square root --

$\sqrt{25} = \pm 5$

radical sign --

$\sqrt{\quad}$

**Example 1: Simplify each expression.**

a.  $\sqrt{49}$

$$= 7$$

b.  $\sqrt{64}$

$$= 8$$

c.  $\sqrt{25}$

$$= 5$$

d.  $\sqrt{144}$

$$= 12$$

**radical expression --**

$$\sqrt{3} \quad 2\sqrt{3} \quad \sqrt{3} + \sqrt{2}$$

**radicand --**

*inside the radical sign*

**Product Property of Square Roots --The square root of a product is equal to the product of each square root.**

$$\sqrt{6} = \sqrt{2} \cdot \sqrt{3}$$

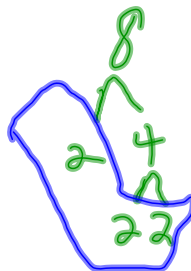
$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

**Example 2: Simplify.**


a.  $\sqrt{12}$

$$= \sqrt{2 \cdot 2 \cdot 3}$$
$$= 2\sqrt{3}$$


b.  $\sqrt{8}$

$$= \sqrt{2 \cdot 2 \cdot 2}$$
$$= 2\sqrt{2}$$


c.  $\sqrt{75}$

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


d.  $\sqrt{20}$

$$= \sqrt{2 \cdot 2 \cdot 5}$$
$$= 2\sqrt{5}$$


**Example 3: Simplify.**

a.  $\sqrt{3} \cdot \sqrt{6}$

$$= \sqrt{3 \cdot 3 \cdot 2}$$
$$= 3\sqrt{2}$$

b.  $\sqrt{5} \cdot \sqrt{10}$

$$= \sqrt{5 \cdot 5 \cdot 2}$$
$$= 5\sqrt{2}$$

c.  $\sqrt{3} \cdot \sqrt{15}$

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

d.  $\sqrt{3} \cdot \sqrt{7}$

$$= \sqrt{21}$$

**Quotient Property of Square Roots** -- The square root of a quotient is equal to the quotient of each square root.

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

$$\sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}}$$

**Example 4:** Simplify each expression.

a.  $\frac{\sqrt{16}}{\sqrt{8}} = \sqrt{\frac{16}{8}} = \sqrt{2}$

b.  $\sqrt{\frac{9}{4}} = \frac{\sqrt{9}}{\sqrt{4}} = \frac{3}{2}$

c.  $\frac{\sqrt{81}}{\sqrt{100}} = \frac{9}{10}$

d.  $\sqrt{\frac{49}{64}} = \frac{\sqrt{49}}{\sqrt{64}} = \frac{7}{8}$

**Example 5: Simplify.**

$$\begin{aligned} \text{a. } & \frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{9}} \\ & = \frac{\sqrt{15}}{5} \end{aligned}$$

$$\begin{aligned} \text{b. } & \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \\ & = \frac{2\sqrt{3}}{3} \end{aligned}$$

$$\begin{aligned} \text{c. } & \frac{\sqrt{7}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \\ & = \frac{\sqrt{14}}{2} \end{aligned}$$

$$\begin{aligned} \text{d. } & \frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \\ & = \frac{4\sqrt{3}}{3} \end{aligned}$$

### Rules for Simplifying Radical Expressions

1. There are no perfect square factors other than 1 in the radicand.
2. The radicand is not a fraction.
3. The denominator does not contain a radical expression.

**Guided Practice:**

1. Write the symbol for the square root of 100.

$$\sqrt{100}$$

2. Find the next three perfect squares after 16.

$$25, 36, 49$$

3. You Decide. Talisa says that  $\sqrt{30}$  is in simplest form. Roberta says it is not. Who is correct? Explain.

Talisa

$$\begin{array}{c} \sqrt{30} \\ \wedge \\ 2 \quad 15 \\ \quad \wedge \\ \quad 3 \quad 5 \\ \hline \sqrt{2 \cdot 3 \cdot 5} \end{array}$$

**Partner Work: Do the following problems and turn in one sheet per person with all the work.**

**p. 552 # 4 - 14**

**Do you have any Vocab questions?**

**OBJECTIVE:**

**HOMEWORK: p. 552 - 553**

**# 16 - 40 even, 41 - 43, 50 - 52**