

11-29-18

Aim: SWBAT multiply and divide radical expressions.

HW: Packet Page 16

Puzzle due tomorrow

Do Now: Packet Page 14

Multiplying and Dividing with Square Roots

Aim: SWBAT express multiply and divide radical expressions.

Do Now: Write each of the following in simplest form.

1) $\sqrt{63}$

$3\sqrt{7}$

2) $4\sqrt{12}$

$8\sqrt{3}$

3) $\frac{3}{2}\sqrt{80}$

$6\sqrt{5}$

An expression is in SIMPLEST RADICAL FORM if all of the following statements are true:

- The radicand has no perfect square factors OTHER THAN 1.
- The radicand contains NO FRACTIONS.
- No radicals appear in the DENOMINATOR of a fraction.

Multiplying Square Roots:

- Multiply the coefficients
- Multiply the radicands
- Simplify when necessary

Express each product in simplest radical form:

Example 1: $\sqrt{2} \cdot \sqrt{6}$

$$\begin{aligned} &\sqrt{12} \\ &\sqrt{4 \cdot 3} \\ &\sqrt{4} \cdot \sqrt{3} \\ &2\sqrt{3} \end{aligned}$$

Example 2: $2\sqrt{3} \cdot 5\sqrt{2}$

$$\begin{aligned} &(2 \cdot 5) \cdot (\sqrt{3} \cdot \sqrt{2}) \\ &10\sqrt{6} \end{aligned}$$

Example 3: $-3\sqrt{6} \cdot 2\sqrt{3}$

$$\begin{aligned} &(-3 \cdot 2) \cdot (\sqrt{6} \cdot \sqrt{3}) \\ &\swarrow \quad \searrow \\ &-6\sqrt{18} \\ &-6 \cdot \sqrt{9 \cdot 2} \\ &-6 \cdot \sqrt{9} \cdot \sqrt{2} \\ &-6 \cdot 3 \cdot \sqrt{2} \\ &-18\sqrt{2} \end{aligned}$$

$$\begin{aligned} &-6 \cdot (\sqrt{2} \cdot \sqrt{3} \cdot \sqrt{3}) \\ &-6 \cdot (\sqrt{2} \cdot \sqrt{3^2}) \\ &-6 \cdot \sqrt{2} \cdot 3 \\ &-18\sqrt{2} \end{aligned}$$

Example 4: $5\sqrt{8} \cdot -3\sqrt{8}$

$$\rightarrow (5 \cdot -3) \cdot (\sqrt{8})^2$$

$-15 \cdot 8$

-120

Dividing Square Roots:

- Divide the coefficients
- Divide the radicands
- Simplify when necessary (No square roots allowed in the denominator)

Example 1: $\frac{\sqrt{15}}{\sqrt{5}}$

$$\frac{\sqrt{\frac{15}{5}}}{\sqrt{3}} \rightarrow \frac{\sqrt{3 \cdot \cancel{5}}}{\sqrt{\cancel{5}}} = \sqrt{3}$$

Example 2: $\frac{6\sqrt{10}}{2\sqrt{2}}$

$$\left(\frac{6}{2}\right) \left(\sqrt{\frac{10}{2}}\right) = 3\sqrt{5}$$

Example 3: $\frac{-12\sqrt{26}}{3\sqrt{13}}$

$$\begin{aligned} &\left(\frac{-12}{3}\right) \left(\frac{\sqrt{26}}{\sqrt{13}}\right) \\ &= -4 \cdot \sqrt{\frac{26}{13}} \\ &= -4 \cdot \sqrt{2} \\ &= -4\sqrt{2} \end{aligned}$$

Example 4: $\frac{-15\sqrt{54}}{3\sqrt{6}}$

$$\begin{aligned} &= \frac{-15}{3} \cdot \sqrt{\frac{54}{6}} \\ &= -5 \cdot \sqrt{9} \\ &= -5 \cdot 3 \\ &= -15 \end{aligned}$$

Square Roots to Memorize:

$\sqrt{8}$

$2\sqrt{2}$

$\sqrt{12}$

$2\sqrt{3}$

$\sqrt{20}$

$2\sqrt{5}$

$\sqrt{18}$

$3\sqrt{2}$

$\sqrt{27}$

$3\sqrt{3}$

$\sqrt{80}$

$4\sqrt{5}$

Homework:

1) $(\sqrt{3})(\sqrt{8})$

2) $(-3\sqrt{5})(2\sqrt{4})$

3) $(2\sqrt{9})(2\sqrt{4})$

4) $\frac{-\sqrt{54}}{\sqrt{6}}$

5) $\frac{20\sqrt{80}}{-5\sqrt{5}}$

6) $\frac{\sqrt{180}}{\sqrt{5}}$

7) $\frac{8\sqrt{36}}{2\sqrt{9}}$

8) $\frac{6\sqrt{24}}{9\sqrt{8}}$

9) $\sqrt{3}(3+\sqrt{3})$

10) Find the product of $3\sqrt{14}$ and $-2\sqrt{21}$