

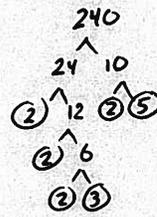
XX - Worksheet - 5.2 Multiplying and Dividing Radical Expressions

Pg 289 #1ac: Multiply. Express all products in simplest form. → Mixed Radical

$$\begin{array}{l} \underline{2x}(\underline{7x}) \\ 14x^2 \end{array}$$

$$\begin{array}{l} \underline{2\sqrt{5}}(\underline{7\sqrt{3}}) \\ 14\sqrt{15} \end{array}$$

$$\begin{array}{l} 2^4\sqrt{48}(\sqrt[4]{5}) \\ 2^4\sqrt{240} \\ 2^4\sqrt{2^4 \cdot 3 \cdot 5} \\ 2 \cdot 2 \sqrt[4]{3 \cdot 5} \\ 4 \sqrt[4]{15} \end{array}$$



$$\begin{array}{l} \sqrt[3]{54y^7}(\sqrt[3]{6y^4}) \\ \sqrt[3]{2 \cdot 3^3 y^7} \cdot \sqrt[3]{2 \cdot 3 \cdot y^4} \\ \sqrt[3]{2^2 \cdot 3^4 \cdot y^{11}} \\ \sqrt[3]{2^2 \cdot 3^3 \cdot 3 \cdot y^3 \cdot y^3 \cdot y^3 \cdot y^2} \\ 3 \cdot y \cdot y \cdot y \sqrt[3]{2^2 \cdot 3 \cdot y^2} \\ 3y^3 \sqrt[3]{12y^2} \end{array}$$

Pg 289 #2ac: Multiply using the distributive property. Then, simplify.

$$\begin{array}{l} \overbrace{5(x-3)} \\ 5x-15 \end{array}$$

$$\begin{array}{l} \overbrace{\sqrt{11}(3-4\sqrt{7})} \\ 3\sqrt{11} - 4\sqrt{77} \end{array}$$

$$\begin{array}{l} \overbrace{\sqrt{y}(2\sqrt{y}+1), y \geq 0} \\ 2\sqrt{y}\sqrt{y} + 1\sqrt{y} \\ 2\sqrt{y^2} + 1\sqrt{y} \\ 2y + \sqrt{y} \quad \text{where } y \geq 0 \end{array}$$

Pg 289 #3ac: Simplify. Identify the values of the variables for which the radicals represent real numbers.

$$\begin{array}{l} \overbrace{-3(\sqrt{2}-4) + 9\sqrt{2}} \\ \underline{-3\sqrt{2}} + 12 + \underline{9\sqrt{2}} \\ 6\sqrt{2} + 12 \end{array}$$

$$\begin{array}{l} \overbrace{4\sqrt{5}(\sqrt{3j}+8) - 3\sqrt{15j} + \sqrt{5}} \\ \underline{4\sqrt{15j}} + 32\sqrt{5} - \underline{3\sqrt{15j}} + \sqrt{5} \\ \sqrt{15j} + 33\sqrt{5}, \quad j \geq 0 \end{array}$$

Pg 290 #5ac: Expand and simplify. State any restrictions on the values for the variables.

$$(x+3)(x+5)$$

$$x^2 + 5x + 3x + 15$$

$$(15\sqrt{c} + 2)(\sqrt{2c} - 6)$$

$$15\sqrt{2c^2} - 90\sqrt{c} + 2\sqrt{2c} - 12$$

$$15c\sqrt{2} - 90\sqrt{c} + 2\sqrt{2c} - 12, c \geq 0$$

$$(9\sqrt{2m} - 4\sqrt{6m})^2$$

$$(9\sqrt{2m} - 4\sqrt{6m})(9\sqrt{2m} - 4\sqrt{6m})$$

$$81\sqrt{4m^2} - 36\sqrt{12m^2} - 36\sqrt{12m^2} + 16\sqrt{36m^2}$$

$$81\sqrt{2^2 m^2} - 36\sqrt{2^2 \cdot 3 \cdot m^2} - 36\sqrt{2^2 \cdot 3 \cdot m^2} + 16\sqrt{2^2 \cdot 3^2 \cdot m^2}$$

$$81 \cdot 2 \cdot m - 36 \cdot 2 \cdot m \sqrt{3} - 36 \cdot 2 \cdot m \sqrt{3} + 16 \cdot 2 \cdot 3 \cdot m$$

$$\underline{162m} - 72m\sqrt{3} - 72m\sqrt{3} + \underline{96m}$$

$$258m - 144m\sqrt{3}, m \geq 0$$

Pg 290 #6ac: Divide. Express your answers in simplest form.

$$\frac{\sqrt{80}}{\sqrt{10}} = \sqrt{\frac{80}{10}} = \sqrt{8} = \sqrt{2^2 \cdot 2} = 2\sqrt{2}$$

$$\frac{3\sqrt{22}}{\sqrt{11}} = 3\sqrt{\frac{22}{11}} = 3\sqrt{2}$$

Pg 290 #8ac: Rationalize each denominator. Express each radical in simplest form.

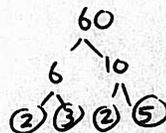
$$\frac{20}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{20\sqrt{10}}{\sqrt{100}} = \frac{20\sqrt{10}}{10} = 2\sqrt{10}$$

$$-\frac{2}{3}\sqrt{\frac{5}{12u}}, u > 0$$

$$-\frac{2}{3}\sqrt{\frac{5}{12u}} = \frac{-2\sqrt{5}}{3\sqrt{12u}} \cdot \frac{\sqrt{12u}}{\sqrt{12u}} = \frac{-2\sqrt{60u}}{3\sqrt{144u^2}}$$

$$= \frac{-2\sqrt{2^2 \cdot 3 \cdot 5 \cdot u}}{3 \cdot 12u} = \frac{-2 \cdot 2 \sqrt{15u}}{36u} = \frac{-4\sqrt{15u}}{36u}$$

$$= \frac{-\sqrt{15u}}{9u}$$



Pg 290 #10ac: Rationalize each denominator. Simplify.

$$\frac{5}{2-\sqrt{3}} \cdot \frac{(2+\sqrt{3})}{(2+\sqrt{3})} = \frac{10+5\sqrt{3}}{4+2\sqrt{3}-2\sqrt{3}-\sqrt{9}}$$

$$= \frac{10+5\sqrt{3}}{4-3} = \frac{10+5\sqrt{3}}{1}$$

$$= 10+5\sqrt{3}$$

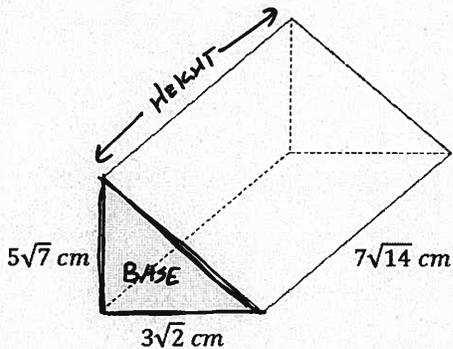
$$\frac{-\sqrt{7}}{\sqrt{5}-2\sqrt{2}} \cdot \frac{(\sqrt{5}+2\sqrt{2})}{(\sqrt{5}+2\sqrt{2})}$$

$$= \frac{-\sqrt{35} - 2\sqrt{14}}{\sqrt{25} + 2\sqrt{10} - 2\sqrt{10} - 4\sqrt{4}}$$

$$= \frac{-\sqrt{35} - 2\sqrt{14}}{5 - 4(2)} = \frac{-\sqrt{35} - 2\sqrt{14}}{5-8}$$

$$= \frac{-\sqrt{35} - 2\sqrt{14}}{-3} = \frac{\sqrt{35} + 2\sqrt{14}}{3}$$

Pg 290 #21: What is the volume of the right triangular prism?



$$V = (\text{Area of Base}) \times \text{Height}$$

$$V = \left(\frac{5\sqrt{7} \cdot 3\sqrt{2}}{2} \right) \times 7\sqrt{14}$$

$$= \left(\frac{15\sqrt{14}}{2} \right) \times \left(\frac{7\sqrt{14}}{1} \right)$$

$$= \frac{105\sqrt{14^2}}{2} = \frac{105 \cdot 14}{2} = 735 \text{ cm}^2$$