

11.2: Multiplying and Dividing Radicals

To simplify radical expressions involving multiplication and division, use:

- The Product Property: $\sqrt{a} \cdot \sqrt{b} = \sqrt{a \cdot b}$
- The Quotient Property: $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

****Make sure there are no fractions left under radicals or radicals left in the denominator of fractions!!**

Simplify each:

1. $\sqrt{5} \cdot \sqrt{10} = \sqrt{50}$ $= \sqrt{25 \cdot 2}$ $= 5\sqrt{2}$	2. $\sqrt{3x} \cdot \sqrt{15xy} = \sqrt{75x^2y}$ $= \sqrt{25 \cdot 3x^2y}$ $= 5x\sqrt{3y}$
3. $\sqrt{\frac{5}{81}} = \frac{\sqrt{5}}{\sqrt{81}} = \frac{\sqrt{5}}{9}$	4. $\sqrt{\frac{2x^2}{9y^2}} = \frac{\sqrt{2x^2}}{\sqrt{9y^2}} = \frac{x\sqrt{2}}{3y}$

Try to simplify $\sqrt{\frac{16}{3}} = \frac{\sqrt{16}}{\sqrt{3}} = \frac{4}{\sqrt{3}}$

What happens? Still have $\sqrt{3}$ in denominator.

In this case, you must RATIONALIZE THE DENOMINATOR by multiplying the numerator and denominator by the radical part of the denominator.

5. $\frac{5}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$ $\frac{5\sqrt{7}}{\sqrt{49}}$ $\frac{5\sqrt{7}}{7}$	6. $\sqrt{\frac{3x}{50}} = \frac{\sqrt{3x}}{\sqrt{50}}$ $= \frac{\sqrt{3x}}{\sqrt{25 \cdot 2}}$ $= \frac{\sqrt{3x}}{5\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$ $= \frac{\sqrt{6x}}{5\sqrt{4}}$ $= \frac{\sqrt{6x}}{10}$	7. $\frac{9}{\sqrt{2x}} \cdot \frac{\sqrt{2x}}{\sqrt{2x}}$ $= \frac{9\sqrt{2x}}{\sqrt{4x^2}}$ $= \frac{9\sqrt{2x}}{2x}$
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