

Objective:

Students will be able to simplify radicals.

Radicals

The expression \sqrt{s} is called a radical. The symbol $\sqrt{}$ is a radical sign (and also in this case a square root), and the number s beneath the radical sign is called the radicand of the expression.

Properties of square roots ($a > 0, b > 0$):

Product Property- $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

Quotient Property- $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

Simplifying radicals

To simplify radicals, you want to look for the largest perfect square that the radicand can be divided by.

Never leave a radical in the denominator!

Simplifying radicals examples

$$\begin{aligned} 1) \quad \sqrt{48} &= \sqrt{16 \cdot 3} \\ &= \sqrt{16} \cdot \sqrt{3} \\ &= 4\sqrt{3} \end{aligned}$$

$$\begin{aligned} 2) \quad \sqrt{18} + \sqrt{32} + \sqrt{75} &= \sqrt{9 \cdot 2} + \sqrt{16 \cdot 2} + \sqrt{25 \cdot 3} \\ &= 3\sqrt{2} + 4\sqrt{2} + 5\sqrt{3} \\ &= 5\sqrt{3} + 7\sqrt{2} \end{aligned}$$

Simplifying radicals examples cont.

$$\begin{aligned} 3) \quad \sqrt{\frac{5}{3}} &= \frac{\sqrt{5}}{\sqrt{3}} \\ &= \frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \\ &= \frac{\sqrt{15}}{3} \end{aligned}$$

4) Solve $(3\sqrt{5})^2 + (3\sqrt{2})^2 = x^2$ for x .

$$9 \cdot 5 + 9 \cdot 2 = x^2$$

$$45 + 18 = x^2$$

$$63 = x^2$$

$$\pm\sqrt{63} = x$$

$$\pm\sqrt{9 \cdot 7} = x$$

$$\pm 3\sqrt{7} = x$$

Simplifying Radicals Activity- Scavenger Hunt

With a partner, pick a place to start in the room. Copy down the radical that needs to be simplified and then go back to your seat and simplify the radical. Find the answer around the room and write down the letter that corresponds to that answer. Copy down the new equation on that sheet and simplify. Continue doing so until you have simplified all of the problems around the room and have “decoded” the message.