

Algebra 1

Chapter 10

Section 10-2

Common Perfect Squares List

$$\sqrt{1} = 1$$

$$\sqrt{4} = 2$$

$$\sqrt{9} = 3$$

$$\sqrt{16} = 4$$

$$\sqrt{25} = 5$$

$$\sqrt{36} = 6$$

$$\sqrt{49} = 7$$

$$\sqrt{64} = 8$$

$$\sqrt{81} = 9$$

$$\sqrt{100} = 10$$

$$\sqrt{121} = 11$$

$$\sqrt{144} = 12$$

$$\sqrt{169} = 13$$

Simplify the radicals

$$\sqrt{36}$$

$$\underline{6}$$

$$\sqrt{144d^4}$$

$$\underline{12d^2}$$

$$\sqrt{225}$$

$$15$$

$$\sqrt{(2c)^4}$$

$$(2c)^2$$

$$4c^2$$

$$\sqrt{16c^4}$$

$$4c^2$$

Which expression cannot be simplified?

$$-\sqrt{64}$$

↙ 8

$$\sqrt{-64}$$

cannot
have
neg
under
√

Take note

Property Multiplication Property of Square Roots**Algebra**For $a \geq 0$ and $b \geq 0$, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$.**Example**

$$\sqrt{48} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3}$$

$$\sqrt{16 \cdot 3}$$

Take note

Property Division Property of Square Roots**Algebra**For $a \geq 0$ and $b > 0$, $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$.**Example**

$$\frac{\sqrt{36}}{\sqrt{49}} = \frac{\sqrt{36}}{\sqrt{49}} = \frac{6}{7}$$

Simplify the radicals

$$\begin{array}{c} \sqrt{72} \\ \swarrow \quad \searrow \\ \sqrt{36} \quad \sqrt{2} \\ \downarrow \quad \downarrow \\ 6 \quad \sqrt{2} \end{array}$$

$$\begin{array}{c} a^3 = a^2 \cdot a \\ \sqrt{9a^3} \\ \swarrow \quad \searrow \\ \sqrt{9a^2} \quad \sqrt{a} \\ \downarrow \quad \downarrow \\ 3a \sqrt{a} \end{array}$$

$$\begin{array}{c} \sqrt{\frac{27}{75}} \div 3 \\ \sqrt{\frac{9}{25}} \\ \frac{\sqrt{9}}{\sqrt{25}} \\ \frac{3}{5} \end{array}$$

$$\begin{array}{c} 10\sqrt{32x^7} \\ \swarrow \quad \searrow \\ \sqrt{16x^6} \quad \sqrt{2x} \\ \downarrow \quad \downarrow \\ 10 \cdot 4 \quad x^3 \quad \sqrt{2x} \\ \hline 40x^3 \sqrt{2x} \end{array}$$

Simplify the products

$$\begin{aligned} & \sqrt{12y} \cdot \sqrt{3y^7} \\ & \hline & \sqrt{36y^8} \\ & 6y^4 \end{aligned}$$

$$\begin{aligned} & 5\sqrt{2s^9} \cdot \sqrt{50s^{-7}} \\ & \hline & \sqrt{100s^2} \\ & \downarrow \\ & 5 \cdot 10s \\ & 50s \end{aligned}$$

Simplify the quotient

$$x^4 \cdot x^4 = x^8$$

$$\frac{36x^{12}}{4x^4} \quad 12 - 4 = 8$$
$$\sqrt{9x^8}$$
$$3x^4$$

Simplify the quotient

Rationalize the denominator.

$$\frac{\sqrt{11}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{33}}{\sqrt{9}}$$

$$\frac{\sqrt{33}}{3}$$

$$\frac{\sqrt{50}}{\sqrt{8a^3}} = \frac{\sqrt{25}}{\sqrt{4a^3}} = \frac{5}{2a\sqrt{a}} \cdot \frac{\sqrt{a}}{\sqrt{a}}$$

$$\frac{5\sqrt{a}}{2a^2}$$

$$\frac{\sqrt{40}}{\sqrt{12x^5}} \div 4 = \frac{\sqrt{10}}{\sqrt{3x^5}}$$

$$x^2 \leftarrow \sqrt{x^4} \sqrt{3x}$$

$$\frac{\sqrt{10}}{x^2 \sqrt{3x}} \cdot \frac{\sqrt{3x}}{\sqrt{3x}} = \frac{\sqrt{30x}}{x^2 \sqrt{9x^2}} = \frac{\sqrt{30x}}{3x^3}$$

$$\frac{\sqrt{45}}{\sqrt{25}} \div 5 = \frac{\sqrt{9}}{\sqrt{5}} = \frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{\sqrt{25}} = \frac{3\sqrt{5}}{5}$$

Simplify Fraction

Simplify Roots

Multiply by bottom $\sqrt{\quad}$

Simplify