

Simplify. Assume each radical represents a real number.

$$1. \sqrt{175} = 5\sqrt{7}$$

$\begin{matrix} & \wedge \\ 25 & 7 \\ \wedge \\ 5 & 5 \end{matrix}$

$$2. \sqrt{27} = 3\sqrt{3}$$

$\begin{matrix} & \wedge \\ 9 & 3 \\ \wedge \\ 3 & 3 \end{matrix}$

$$3. \sqrt{5} \cdot \sqrt{20} = 5 \cdot 2 = 10$$

$\begin{matrix} & \wedge \\ 5 & 4 \\ \wedge \\ 2 & 2 \end{matrix}$

$$4. \sqrt{10} \cdot \sqrt{6\sqrt{3}} = 2 \cdot 3\sqrt{5} = 6\sqrt{5}$$

$\begin{matrix} & \wedge & & \wedge \\ 2 & 5 & & 2 & 3 \end{matrix}$

$$5. \sqrt{\frac{20}{45}} = \frac{2\sqrt{5}}{3\sqrt{5}} = \frac{2}{3}$$

$\begin{matrix} 20 & & 45 \\ \wedge & & \wedge \\ 5 & 4 & 9 & 5 \\ \wedge & & \wedge \\ 2 & 2 & 3 & 3 \end{matrix}$

$$6. \sqrt{\frac{48}{3}} = \frac{2 \cdot 2 \sqrt{3}}{\sqrt{3}} = 4$$

$\begin{matrix} 48 \\ \wedge & & \wedge \\ 4 & 12 \\ \wedge & & \wedge \\ 2 & 2 & 4 & 3 \\ & & \wedge \\ & & 2 & 2 \end{matrix}$

$$7. \sqrt{360rs^2t^3} = 6st\sqrt{10rt}$$

$\begin{matrix} 360 \\ \wedge \\ 36 & 10 \\ \wedge & \wedge \\ 6 & 6 & 2 & 5 \end{matrix}$

$$8. \sqrt{250r^6s^5} = 5r^3s^2\sqrt{10s}$$

$\begin{matrix} 250 \\ \wedge & & \wedge \\ 25 & 10 \\ \wedge & & \wedge \\ 5 & 5 & 2 & 5 \end{matrix}$

$$9. \sqrt{\frac{50x^3}{108t^3}} = \frac{5x\sqrt{2x}}{6t\sqrt{3t}} \cdot \frac{\sqrt{3t}}{\sqrt{3t}}$$

$\begin{matrix} 50 & & 108 \\ \wedge & & \wedge \\ 25 & 2 & 9 & 12 \\ \wedge & & \wedge & \wedge \\ 5 & 5 & 3 & 3 & 4 & 3 \\ & & & & \wedge \\ & & & & 2 & 2 \end{matrix}$

$$= \frac{5x\sqrt{6tx}}{6t \cdot 3t}$$

$$= \frac{5x\sqrt{6tx}}{18t^2}$$

$$10. \sqrt{\frac{9u^4}{5}} = \frac{3u^2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$$

$$= \frac{3u^2\sqrt{5}}{5}$$

$$11. \sqrt{49a^4 + 49b^4} = \sqrt{49(a^4 + b^4)}$$

$$= 7\sqrt{a^4 + b^4}$$

$$12. \sqrt{\frac{x^2}{4} + \frac{y^2}{4}} = \sqrt{\frac{1}{4}(x^2 + y^2)}$$

$$= \frac{1}{2}\sqrt{x^2 + y^2}$$

(Hint: Factor First)

$$13. \sqrt{x^2 + 12x + 36} = \sqrt{(x+6)^2}$$

$$= x+6$$

$$14. \sqrt{2x^2 + 20x + 50} = \sqrt{2(x^2 + 10x + 25)}$$

$$= \sqrt{2(x+5)^2}$$

$$= (x+5)\sqrt{2}$$

15. What does it mean to rationalize the denominator?

Rationalizing the denominator is the act of removing the square root from the lower half of the fraction by multiplying both the top and bottom of the fraction by the square root.