Some radicals like $\sqrt{64}$, $\sqrt{9}$, & $\sqrt{100}$ simplify to a whole #. ☺

Make a factor tree & find pairs to come out of the radical.

❶ Simplify $\sqrt{32}$

$\sqrt{2\cdot2\cdot2\cdot2\cdot2}$

$2\cdot2\sqrt{2} = 4\sqrt{2}$

32 → 8, 4 → 2, 4, 2, 2 → 2, 2

❷ Simplify $\sqrt{75x^3}$

$\sqrt{3\cdot5\cdot5\cdot x\cdot x\cdot x}$

$5x\sqrt{3x}$

75 → 25, 3 → 5, 5

Simplify

Multiply

Divide

Rationalize the Denominator

Add & Subtract

Product Property

Algebra:

$\sqrt{ab} = \sqrt{a}\cdot\sqrt{b}$

Multiply outside together
Multiply inside together
Simplify radical if possible

Examples:

❸ $\sqrt{9}\cdot\sqrt{9} = \sqrt{81} = 9$

$3\cdot3$

9

❹ $3\sqrt{g}\cdot4\sqrt{2g^3}$

$3\sqrt{2g^4}$

$3\sqrt{2\cdot g\cdot g\cdot g\cdot g} = 3g\cdot g\sqrt{2}$

$3g^2\sqrt{2}$

❺ $2\sqrt{mn^2}\cdot\sqrt{5m^2}$

$2\sqrt{5m^3n^2}$

$2\sqrt{5\cdot m\cdot m\cdot m\cdot n\cdot n} = 2mn\sqrt{5m}$

Multiply

Divide

Rationalize the Denominator

Add & Subtract

Quotient Property

Algebra:

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

simplify the numerator & denominator separately.

Examples:

6. $\sqrt{\frac{5}{49}} = \frac{\sqrt{5}}{\sqrt{49}} = \boxed{\frac{\sqrt{5}}{7}}$

7. $\sqrt{\frac{11}{d^4}} = \frac{\sqrt{11}}{\sqrt{d^4}} = \boxed{\frac{\sqrt{11}}{d^2}}$

$\sqrt{d \cdot d \cdot d \cdot d}$

$d|d$

Divide

Rationalize the Denominator

Add & Subtract

Prime #'s:

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47