1.4

Radicals

Simplify

Multiply

Divide

Rationalize the Denominator

Add & Subtract

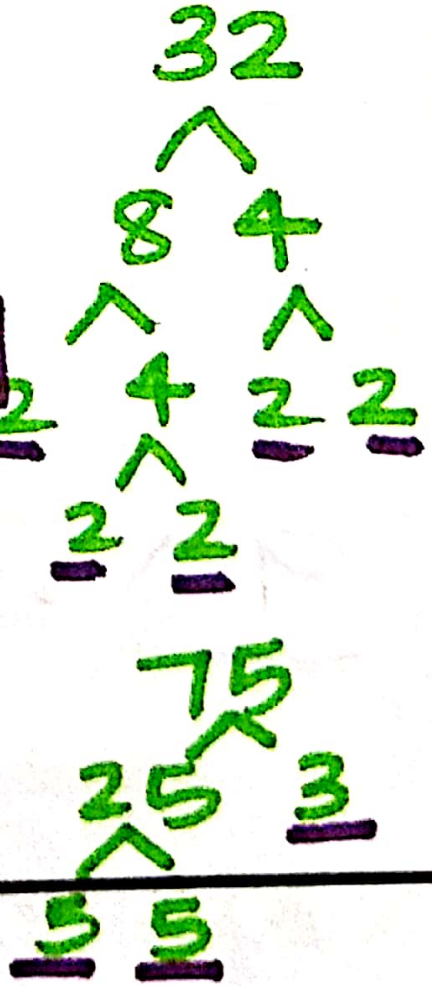
Use factor tree or birthday cake to find prime factorization.

Find pairs so they can come out.

1. Simplify $\sqrt{32}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$

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



2. Simplify $\sqrt{75x^3}$

$\sqrt{3 \cdot 5 \cdot 5 \cdot x \cdot x \cdot x}$

$5x\sqrt{3x}$

Simplify

Product Property

Algebra:

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

Examples:

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

$= \sqrt{81}$

$= 9$

❹ $3\sqrt{g} \cdot \sqrt{2g^3}$

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

$3\sqrt{2g^4}$

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

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

❺ $2\sqrt{mn^2} \cdot \sqrt{5m^2}$

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

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

$2nm\sqrt{5m}$

Multiply

Quotient Property

Algebra:

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

Examples:

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

49
$7 \quad 7$

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

$= \frac{\sqrt{11}}{d \cdot d} = \frac{\sqrt{11}}{d^2}$

Divide

NO RADICALS CAN BE LEFT IN THE DENOMINATOR!

Multiply by the radicand in the denominator to the top & bottom.

Note: $\frac{\sqrt{7}}{\sqrt{7}} = 1$

Examples:

8. $\frac{7}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \boxed{\frac{7\sqrt{6}}{6}}$

$\sqrt{6} \cdot \sqrt{6}$

$\sqrt{36}$

6

9. $\frac{\sqrt{3}}{\sqrt{5a}} \cdot \frac{\sqrt{5a}}{\sqrt{5a}} = \boxed{\frac{\sqrt{15a}}{5a}}$

$\sqrt{5a} \cdot \sqrt{5a}$

$\sqrt{25a^2}$

$5a$

Rationalize the Denominato

LIKE RADICALS have the same # under the radical.

Add/subtract the coefficients to combine like radicals.

*Make sure all radicals are simplified.

Examples:

⑩ $7\sqrt{14} + \sqrt{21} - 4\sqrt{14}$

$3\sqrt{14} + \sqrt{21}$

14
7 2

21
7 3

⑪ $5\sqrt{7} + \sqrt{28}$

$5\sqrt{7} + \sqrt{2 \cdot 2 \cdot 7}$

$5\sqrt{7} + 2\sqrt{7}$

$7\sqrt{7}$

28
7 4
2 2

Add & Subtract