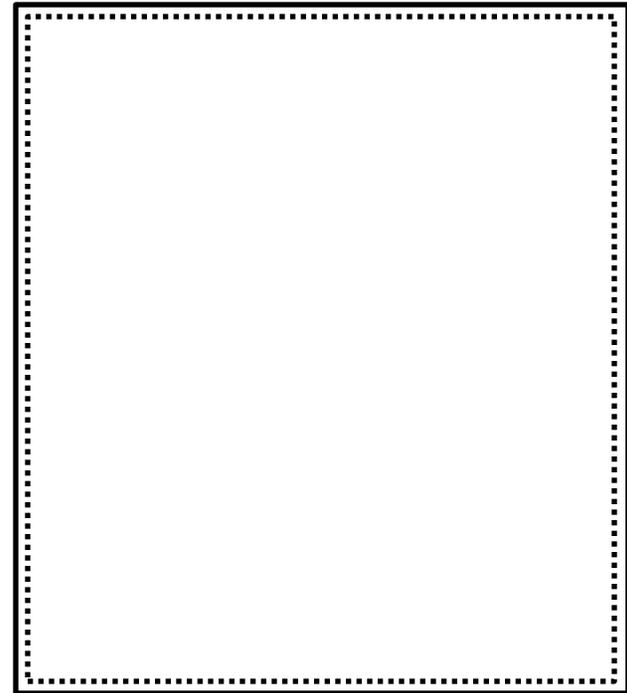
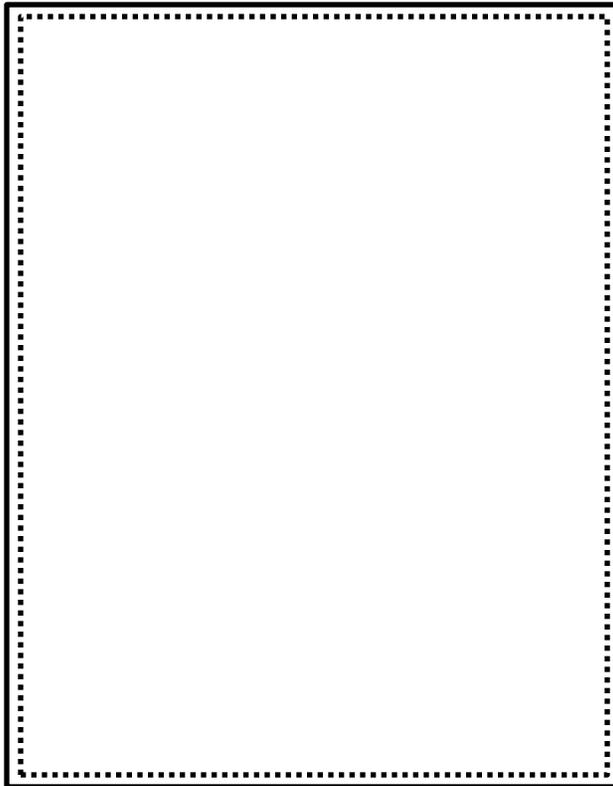


# Radicals



**Examples:**

- 1 Simplify  $\sqrt{32}$
- 2 Simplify  $\sqrt{75x^3}$

**Simplify**

**Examples:**

- 3  $\sqrt{9} \cdot \sqrt{9}$
- 4  $3\sqrt{g} \cdot \sqrt{2g^3}$
- 5  $2\sqrt{mn^2} \cdot \sqrt{5m^2}$

**Multiply**



**Examples:**

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

⑪  $5\sqrt{7} + \sqrt{28}$

**Add & Subtract**

## Product Property

Algebra:

$$\sqrt{ab} =$$

**Examples:**

⑧  $\frac{7}{\sqrt{6}}$

⑨  $\frac{\sqrt{3}}{\sqrt{5a}}$

**Rationalize the Denominator**

## Quotient Property

Algebra:

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

**Examples:**

⑥  $\sqrt{\frac{5}{49}}$

⑦  $\sqrt{\frac{11}{d^4}}$

**Divide**

# Radicals

\*Like radicals can be combined by adding or subtracting (think: like terms).

\*Add/ subtract the coefficient and keep the radical the same.

\*Sometimes you need to simplify the radicals before adding/ subtracting.

## Examples:

① Simplify  $\sqrt{32}$

$$= \sqrt{16 \cdot 2} = 4\sqrt{2}$$

② Simplify  $\sqrt{75x^3}$

$$= \sqrt{25 \cdot 3 \cdot x^2 \cdot x}$$
$$= 5x\sqrt{3x}$$

Simplify

\*A quotient with a square root in the denominator is NOT simplified!

\*To simplify, multiply the fraction by "1" to get a perfect square radicand in the denominator.

Note:

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

## Examples:

③  $\sqrt{9} \cdot \sqrt{9}$   
 $= \sqrt{9 \cdot 9} = \sqrt{81} = 9$

④  $3\sqrt{g} \cdot \sqrt{2g^3}$   
 $= 3\sqrt{2 \cdot g^4} = 3g^2\sqrt{2}$

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

Multiply

Look for the largest perfect square that the radicand is divisible by!

1 4 9 16 25 36 49 64  
81 100 121 144...

**Examples:**

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

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

11  $5\sqrt{7} + \sqrt{28}$

$$\begin{aligned} &5\sqrt{7} + \sqrt{4 \cdot 7} \\ &= 5\sqrt{7} + 2\sqrt{7} \\ &= 7\sqrt{7} \end{aligned}$$

**Add & Subtract**

## Product Property

Algebra:

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

\*Factor the radicand into the product of a perfect square and another number. Take the square root of the perfect square and leave the other number under the radical.

**Examples:**

8  $\frac{7}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{7\sqrt{6}}{\sqrt{36}} = \frac{7\sqrt{6}}{6}$

9  $\frac{\sqrt{3}}{\sqrt{5a}} \cdot \frac{\sqrt{5a}}{\sqrt{5a}} = \frac{\sqrt{15a}}{\sqrt{25a^2}} = \frac{\sqrt{15a}}{5a}$

**Rationalize the Denominator**

## Quotient Property

Algebra:

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

\*Rewrite the fraction as the square roots of the numerator and denominator, separately.  
\*Simplify each square root, if possible.

**Examples:**

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

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

**Divide**

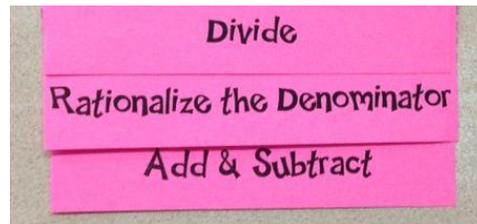
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Directions:

Step 1: Print pages 1 & 2 front to back so that the information is facing in opposite directions.

Step 2: Cut along the dotted lines so that you have 3 narrow strips of paper.

Step 3: Line up the strips so that say “Divide”, “Rationalize the Denominator”, and “Add & Subtract”, as shown below.



Step 4: Fold over the top half of each of the strips & secure at the top with two staples.

The final product should look like this:

