TOPIC: RATIONALIZING DENOMINATORS

$\frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

- Radicals CANNOT be left in the BOTTOM of a fraction. This is **BAD!**
  - If you can't simplify the $\sqrt{\ }$ to perf. square, you must *make* it a perf. square by **Rationalizing the Denominator:**
    - Multiply _____ & __________ by *something* (usually bottom $\sqrt{\ }$)

Radical simplifies to perfect square

$$\frac{\sqrt{2}}{\sqrt{8}} = \sqrt{\frac{2}{8}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

Rationalizing Denominator

EXAMPLE: Rationalize the denominator.

$$\frac{1}{\sqrt{3}} \cdot \left(\frac{\ }{\ }\right)$$

Caution!

Multiplying *only* the bottom is wrong!

PRACTICE: Rationalize the denominator.

$$\frac{-5}{2\sqrt{7}}$$

PRACTICE: Rationalize the denominator.

$$\frac{6+\sqrt{x}}{-\sqrt{x}}$$

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Rationalize Denominators Using Conjugates

- When the denominator has ____ terms, multiplying by same $\sqrt{\ }$ won't eliminate the $\sqrt{\ }$
  - Instead, multiply by the bottom's **conjugate** (reverse ________ between terms)

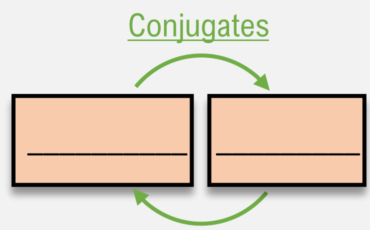
One Term Denominator

$$\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

Two Term Denominator

EXAMPLE: Rationalize the denominator.

$$\frac{1}{2+\sqrt{3}} \cdot \frac{(\qquad)}{(\qquad)}$$



- Multiplying a radical by its **conjugate** ALWAYS ____________ the $\sqrt{\ }$ and results in rational numbers.

PRACTICE: Rationalize the denominator and simplify the radical expression.

$$\frac{\sqrt{7}}{5-\sqrt{6}}$$

SPECIAL PRODUCT FORMULAS
$(\boldsymbol{a}+\boldsymbol{b})(\boldsymbol{a}-\boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

PRACTICE: Rationalize the denominator and simplify the radical expression.

$$\frac{2-\sqrt{3}}{2+\sqrt{3}}$$