# Rationalizing the Denominator: Part 1

In mathematics, it is sometimes easier to work with radical expressions if the denominator does not have any radicals.

Example 1:

$$\frac{1}{\sqrt{2}}$$

Multiplying $\frac{1}{\sqrt{2}}$ by $\frac{\sqrt{2}}{\sqrt{2}}$ will eliminate the radical in the denominator:

$$\frac{1}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \boxed{\frac{\sqrt{2}}{2}}$$

This process of eliminating the radical in the denominator is called **Rationalizing the Denominator**.

Example 2:

Rationalize the Denominator

a.) $\frac{4}{\sqrt{3}}$

b.) $\frac{\sqrt{2}}{\sqrt{6}}$

c.) $\frac{8}{\sqrt{x}}$

d.) $\sqrt{\frac{1}{3}}$

## Rationalizing the Denominator with Cube Roots

Example 3:

Rationalize the Denominator:

a.) $\frac{2}{\sqrt[3]{5}}$

Here, multiplying the top and the bottom by $\sqrt[3]{5^2}$ will rationalize the denominator since: $\sqrt[3]{5} \cdot \sqrt[3]{5^2} = \sqrt[3]{5^3} = 5$

$$\frac{2}{\sqrt[3]{5}}\left(\frac{\sqrt[3]{5^2}}{\sqrt[3]{5^2}}\right) = \frac{2\sqrt[3]{5^2}}{5} = \boxed{\frac{2\sqrt[3]{25}}{5}}$$

b.) $\frac{\sqrt[3]{3}}{\sqrt[3]{4}}$

# Rationalizing the Denominator Part 1

Practice Problems

Rationalize each Denominator:

1. $\sqrt{\frac{1}{5}}$

2. $\frac{9}{\sqrt{x}}$

3. $\frac{\sqrt[3]{5}}{\sqrt[3]{2}}$

4. $\frac{\sqrt[3]{4}}{\sqrt[3]{x^2}}$