In this section we will discuss

* Dividing and Simplifying
* Rationalizing Denominators or numerators with one term

## Dividing and Simplifying

## The Quotient rule for Radicals:

For any real numbers $\sqrt[n]{a}$ and $\sqrt[n]{b}$,where $b\ne 0$

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

Simplify

Ex: $\sqrt[3]{\frac{27}{125}}$ $\sqrt[2]{\frac{y^{2}}{25}}$ $\sqrt{\frac{16x^{3}}{y^{8}}} $ $\sqrt[3]{\frac{81y^{14}}{8x^{3}}}$

Divide and Simplify if possible

Ex:$\sqrt{\frac{75}{3}}$ $\frac{7\sqrt[3]{81}}{\sqrt[3 ]{9}}$ $\frac{\sqrt[3]{189x^{5}y^{7}}}{\sqrt[3]{7x^{2}y^{2}}}$ $\frac{\sqrt[5]{64a^{11}b^{28}}}{\sqrt[5]{2ab^{-2}}}$

$$2a^{2}b^{6}$$

$$3xy\sqrt[3]{y^{2}}$$

$$\frac{\sqrt[3]{r^{3}+s^{3}}}{\sqrt[3]{r+s}}$$

$$\sqrt{r^{2}-rs+s^{2}}$$

## Rationalizing the Denominators or Numerators

To rationalize the denominator means to make the denominator a rational number, which means to say

 “Get rid of all radicals in the denominator”.

Rationalize the Denominator

$\frac{1}{\sqrt{2}}$ $\frac{2\sqrt{5}}{7\sqrt{3}}$ $\sqrt[3]{\frac{5}{4}}$ $\sqrt[3]{\frac{2}{9}}$

 $\sqrt[3]{\frac{5}{2}}$ $\sqrt[3]{\frac{5}{4}}$ $\sqrt[3]{\frac{7x}{3y}}$ $\sqrt[3]{\frac{2}{x^{2}y}}$

$\sqrt{\frac{10ab^{2}}{72a^{3}b}}$ $\sqrt{\frac{21x^{2}y}{75xy^{5}}}$

Rationalize the numerators

$\sqrt{\frac{5}{11}}$ $\frac{\sqrt[3]{5}}{\sqrt[3]{4}}$ $\sqrt{\frac{ab^{5}}{3}}$