

## Preview: Working with Radical Expressions.

Ex. Evaluate

$$\begin{aligned} \text{a) } \sqrt{4} \\ = 2 \end{aligned}$$

$$\begin{aligned} \text{b) } \sqrt[3]{8} \\ = 2 \end{aligned}$$

$$\begin{aligned} \text{c) } \sqrt{-25} \\ \text{no REAL} \\ \text{answer} \end{aligned}$$

$$\begin{aligned} \text{d) } \sqrt[3]{-64} \\ = -4 \end{aligned}$$

Recall: this symbol means  
principle square root (yields a positive answer).

EX. Solve  $x^2 = 16$

$$\begin{aligned} x &= \pm \sqrt{16} \\ x &= \pm 4 \end{aligned}$$

In general:  $\sqrt[n]{x}$  if  $n = 2, 4, 6, 8, \dots$ ,  $x \geq 0$  and  
 $n = 3, 5, 7, \dots$ ,  $x \in \mathbb{R}$

Ex. Simplify.

$$\begin{aligned} \text{a) } \sqrt{x^2} \\ = \sqrt{x \cdot x} \\ = x \end{aligned}$$

$$\begin{aligned} \text{b) } \sqrt{x^4} \\ = \sqrt{x \cdot x \cdot x \cdot x} \\ = x^2 \end{aligned}$$

$$\begin{aligned} \text{c) } \sqrt{x^5} \\ = x\sqrt{x} \end{aligned}$$

$$\begin{aligned} \text{d) } \sqrt[3]{x^6} \\ = x^2 \end{aligned}$$

$$\begin{aligned} \text{e) } \sqrt[3]{x^8} \\ = \sqrt[3]{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x} \\ = x^2 \sqrt[3]{x^2} \end{aligned}$$

We should state the restrictions on  $x$  for the above examples. i.e. say what  $x$  can be.

EX. State the restrictions for the above example.

$$\text{a) } x \in \mathbb{R} \quad \text{b) } x \in \mathbb{R} \quad \text{c) } x \geq 0 \quad \text{d) } x \in \mathbb{R} \quad \text{e) } x \in \mathbb{R}$$