

# Lesson 1.1.1 – Defining, Rewriting and Evaluating Rational Exponents



“I asked you a question buddy, WHAT IS THE SQUARE  
ROOT OF 5286?”

By the end of this lesson, I will be able to answer the following questions...

1. What is a power and a root? What is their relationship?
2. What are the rules for operations with exponents?
3. How/When do I use a calculator to evaluate powers and roots?

# Vocabulary

- Exponential Expressions

- Base
- Exponent (power)

base<sup>exponent</sup>

- Radical Expressions

- Radical sign
- Root
- Radicand

root  $\sqrt{\text{radicand}}$

- The implied “2” when no root is given

$\sqrt{x}$  implies  $\sqrt[2]{x}$

# Prerequisite Skills with Practice

Evaluate without a calculator.

$$\sqrt{16}$$

$$\left(\frac{2}{3}\right)\left(\frac{4}{5}\right)$$

$$(2-5)^2 - 3(4-5)^3$$

Use a calculator to evaluate the following. Round to the nearest hundredth.

$$\sqrt{17}$$

$$\sqrt[4]{23}$$

$$7^{\frac{2}{3}}$$

### Example one

How can the expression

$3^{\frac{6}{5}}$  be rewritten using roots

and powers?

### Example two

How can the expression

$\sqrt[8]{a^c}$  be rewritten using a

rational exponent?

### Example three

Evaluate the exponential expression w/o a calculator.

$$8^{\frac{2}{3}}$$

$$\sqrt[4]{81}$$

### Example four

*Evaluate the expressions*

$$\sqrt{-25} \text{ and } \sqrt{25}$$

*Round to the thousandth.*

*Based on the definition of a root, why are the answers so different?*

### Example five

*When to use a calculator and  
and when to evaluate by hand.*

$$125^{\frac{2}{3}}$$

$$100^{\frac{2}{3}}$$

$$\sqrt[5]{32}$$

$$\sqrt[3]{16}$$

# THE END



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