

Fractional Exponents

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Rationalize the denominators and simplify:

$$\frac{\sqrt{3}}{\sqrt{5}}$$

$$\frac{1}{\sqrt{50}}$$

The n-th Root

What is the solution to $8^{1/3}$?

What is the solution to $(1/32)^{1/5}$?

The n-th Root

Let a be a positive number and n be a positive integer:

$$a^{1/n} = \sqrt[n]{a}$$

The n-th Root

$$\sqrt{\frac{1}{16} + \frac{1}{25}}$$

Easy Mistakes to Make:

$$\frac{2x + 5y}{xy}$$

$$\frac{a}{a^2 + 2a}$$

Functions

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- ▶ Add \$2.00 to a vending machine to receive 1 soft drink.
- ▶ The distance a car can travel is a function of:
 - ▶ How much gasoline is in the fuel tank.
- ▶ Government revenue is a function of:
 - ▶ the tax rate on income.

Example of a Math Function

In math, there is a function that converts air temperature from the celcius scale (C) to fahrenheit (F):

$$F = 1.8C + 32$$

$$\text{Celsius} = \left\{ \begin{array}{c} -10^{\circ} \\ 20^{\circ} \\ 30^{\circ} \end{array} \right\} \rightarrow \quad \rightarrow \text{Fahrenheit} = \left\{ \quad \quad \right\}$$

Find the equation of this function

$$\begin{Bmatrix} 2 \\ 3 \\ 4 \end{Bmatrix} \rightarrow \quad \rightarrow \quad \begin{Bmatrix} 4 \\ 6 \\ 8 \end{Bmatrix}$$

Notation and Language

A general way to write a function is:

$$y = f(x)$$

- ▶ x is called the **independant variable** because it can take on any value in the domain without conditions.
- ▶ x is also called the **exogenous variable** because it is determined “outside” the model.

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- ▶ $f(x)$ is the function pronounced “f of x” or “f-x”.
- ▶ $f(x)$ is also the value of y given the value x .

Example: A model estimates the quality of wine (q) based on average air temperature at the vineyard (at):

$$q = v(at)$$

Identify the following:

- ▶ The function:
- ▶ The independent variable:
- ▶ The dependant variables:
- ▶ The value of q is also equal to:

Summary of Notation

$$y = f(x)$$

- ▶ x can take on any value in the **Domain**.
- ▶ $f(x)$ is the range of f .
- ▶ $(x, f(x))$ is an ordered pair in x, y .