4-1 Defining and Evaluating Logarithms

Objectives:
I understand that the logarithm is the inverse of an exponential.

I can convert between logarithm and exponential form.

$$3^{\boxed{2}} = 9$$

$$\log_3 3^x = \log_3 9$$

$$x = \log_3 9$$

$$\log_3 9 = 2$$

Words: 3 to the power of x is 9

$$\log_2 2^x = \log_2 8$$
$$x = \log_2 8$$

$$\log_2 8 = 3$$

Words: 2 to the power of $\square$ is 8

$$\log_5 5^x = \log_5 100$$
$$x = \log_5 100$$
$$2.7$$

$$\log_5 100$$

Words: 5 to the power of $\square$ is 100

$$\log_3 \frac{1}{9} = -2$$

$$\log_b b^x = \log_b a$$

$$x = \log_b a$$

$$\log_b a = x$$

Words: $b^x = a$

Exponential Equation

$$b^x = a$$

Logarithmic Equation

$$\log_b a = x$$

Is it possible for a logarithm to equal a negative number?

$$\log_b a = \bigcirc$$

Is it possible for a logarithm to equal zero?

$$b^{\circ} = a$$

Does $\log_x 0$ have an answer?

no

Does $\log_x 1$ have an answer?

yes!

Does $\log_x x^5$ have an answer?

$$x^5 = x^5$$

$$\log_3 \sqrt{3} = \frac{1}{2}$$

$$3^{\frac{1}{2}} = \sqrt{3}$$

What is pi?

3.14

What is e?

$$e = 2.71$$

$$\log_{10} = \log$$

Natural log

$$\log_e = \ln$$