8.1 Understanding Logarithms

Exponential Form:

$$c^y = x$$

Logarithmic Form:

$$\log_c x = y$$

Example 1: Rewrite in exponential form

a.) $\log_5 25 = 2$

b.) $\log_x 10 = 3$

Example 2: Rewrite in logarithmic form:

a.) $2^5 = 32$

b.) $5^c = 20$

Example 2: Evaluate by changing the base

a.) $\log_7 49$

b.) $\log_{23} 1$

c.) $\log_3 \sqrt[5]{81}$

d.) $\log_2 8\sqrt{32}$

*If the base for the log is unwritten, we assume that the base is 10.

e.) $\log 0.0001$

f.) $\log 100$

Basic Log Rules:

$\log_c 1 = 0$ since $c^0 = 1$

$\log_c c^x = x$ since $c^x = c^x$

$c^{\log_c x} = x$ since $\log_c x = \log_c x$

Example 2: Solve for x by changing into exponential form:

a.) $\log_5 x = -3$

b.) $\log_{16} x = -\frac{1}{4}$

c.) $\log_x 9 = \frac{2}{3}$

d.) $\log_3 9 = x$

Example 3: Graphing logarithmic functions

Graph $y = 2^x$

a.) State the inverse of this function:

b.) Sketch the graph of $y = 2^x$ and its inverse: Identify

-domain and range

-x-intercept

-y-intercept

-equation of asymptotes