# Activity 3.2 - Answer Key

## Problem 1

Convert to logarithmic form: $8^2 = 64$

$$\log_8(64) = 2$$

## Problem 2

Convert to exponential form: $\log_3(\frac{1}{9}) = -2$

$$3^{-2} = \frac{1}{9}$$

## Problem 3

Evaluate: $\log_4 \frac{1}{64}$

$$y = \log_4 \frac{1}{64}$$
$$4^y = \frac{1}{64}$$
$$y = -3$$

## Problem 4

Evaluate: $\ln e$

$$y = \ln e$$
$$e^y = e$$
$$y = 1$$

## Problem 5

Evaluate: $\log_{\frac{1}{3}} 9$

$$y = \log_{\frac{1}{3}} 9$$
$$(\frac{1}{3})^y = 9$$
$$y = -2$$

**Problem 6**

Evaluate: $\log_7 \sqrt{7}$

$$y = \log_7 \sqrt{7}$$

$$7^y = \sqrt{7}$$

$$y = \frac{1}{2}$$

**Problem 7**

Evaluate: $\log 100$

$$y = \log_{10} 100$$

$$10^y = 100$$

$$y = 2$$

**Problem 8**

Evaluate: $\log_2(-2)$

By observation, $-2$ is not in the domain of the logarithm, and therefore this is undefined.

**Problem 9**

The inverse of the exponential function is the _____.

logarithmic function

**Problem 10**

What is the domain and range of $y = \log_a x$?

domain: $(0, \infty)$, range: $(-\infty, \infty)$

**Problem 11**

What is the domain of $f(x) = \log_5(x - 7)$

$$x - 7 > 0$$

$$x > 7$$

Domain: $(7, \infty)$

**Problem 12**

Solve: $\log_5 1 = y$

$$5^y = 1$$

$$y = 0$$

**Problem 13**

Solve: $\log_5(x + 4) = 2$

$$5^2 = x + 4$$

$$x = 21$$

**Problem 14**

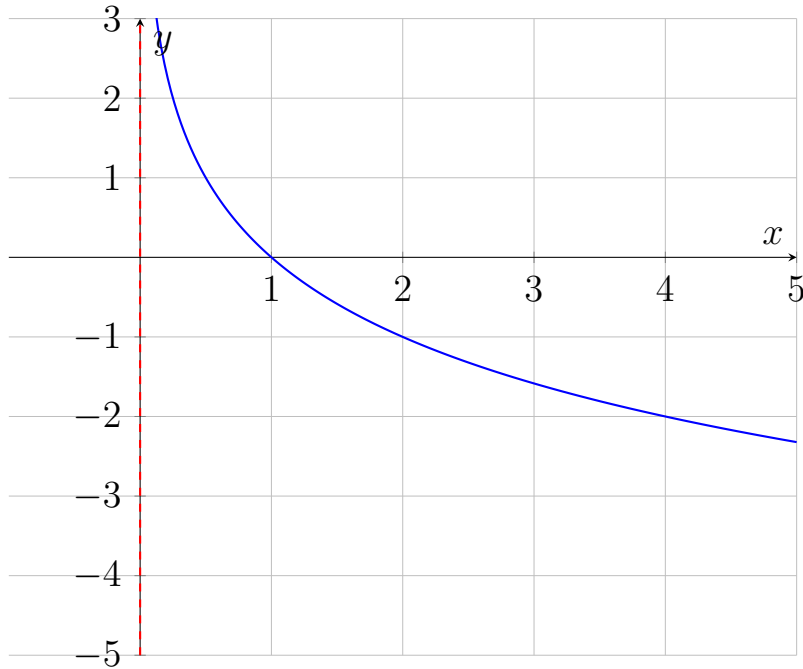Write the equation of the graph $y = \ln(x)$ reflected across the $x$-axis and translated left 2, and up 4.

$$y = -\ln(x + 2) + 4$$

## Graphing Problems:

**Problem 15**

Graph: $f(x) = \log_{\frac{1}{2}} x$



**Problem 16**

Graph: $f(x) = -\log_3(x - 1) - 1$