

LOGARITHMIC FUNCTIONS & THEIR GRAPHS

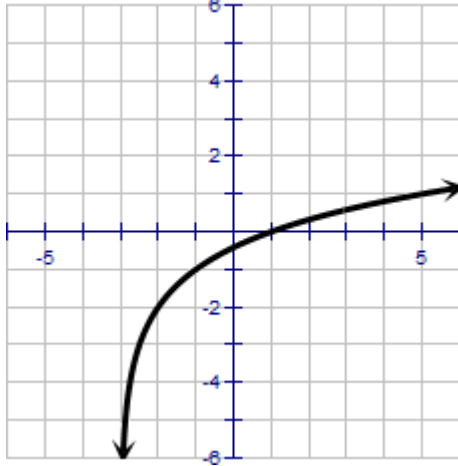
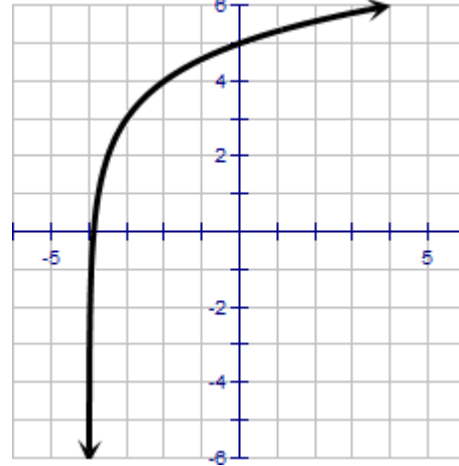
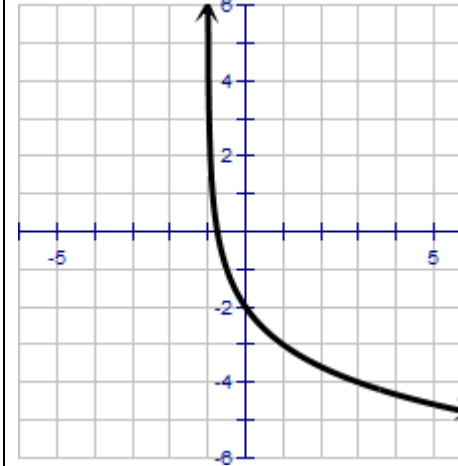
Directions: Using the parent graph of $f(x) = \log_4 x$, describe the transformations of each function.

- 1.) $f(x) = 2\log_4(x - 1) + 3$ 2.) $f(x) = \log_4(2x - 4) - 2$ 3.) $f(x) = \log_4(-3x - 15) - 2$
- 4.) $f(x) = \log_4\left(\frac{1}{2}x + 2\right) + 7$ 5.) $f(x) = \frac{1}{3}\log_4\left(\frac{1}{3} + 6\right) + 5$ 6.) $f(x) = -\log_4(-2x + 6) - 1$

Directions: Using the parent graph of $f(x) = \ln x$, describe the transformations of each function.

- 7.) $f(x) = \frac{1}{2}\ln(2x - 12) + 3$ 8.) $f(x) = -\ln\left(\frac{1}{2}x + 6\right) + 9$ 9.) $f(x) = 3\ln(-x + 5) + 4$
- 10.) $f(x) = \ln\left(\frac{1}{5}x - 1\right) + 2$ 11.) $f(x) = 3\ln(x - 7) + 8$ 12.) $f(x) = \ln(4x - 12) - 4$

Directions: Compare each graph to $f(x) = \log_2 x$. Write the equation as well as a description of each transformation.

		
EQUATION	EQUATION	EQUATION
$f(x) =$ _____	$f(x) =$ _____	$f(x) =$ _____
DESCRIPTION	DESCRIPTION	DESCRIPTION

Directions: Compare each graph to $f(x) = \log_3 x$. Write a description of each transformation and graph each function.

EQUATION	EQUATION	EQUATION
$f(x) = \log_3(x - 1) + 2$	$f(x) = \log_3(x + 5) - 3$	$f(x) = -\log_3(x + 4) - 2$
DESCRIPTION	DESCRIPTION	DESCRIPTION

Directions: Compare each graph to $f(x) = \log_2 x$. Write the equation and graph each function.

EQUATION	EQUATION	EQUATION
$f(x) = \underline{\hspace{2cm}}$	$f(x) = \underline{\hspace{2cm}}$	$f(x) = \underline{\hspace{2cm}}$
DESCRIPTION	DESCRIPTION	DESCRIPTION
An logarithmic function shifted horizontally to the left 3 units and shifted vertically down 3 units.	An logarithmic function shifted horizontally to the right 1 unit and shifted vertically down 4 units.	An logarithmic function shifted horizontally to the left 4 units, shifted vertically up 2 units, and reflected over the x -axis.