

EXPONENTIAL FUNCTIONS & THEIR GRAPHS

Directions: Using the parent graph of $f(x) = 4^x$, describe the transformations of each function.

1.) $f(x) = -2(4)^{x+3} - 5$

LEFT 3 DOWN 5
Reflect over x -axis
Vertical Stretch

2.) $f(x) = 4^{2x+6} + 2$

LEFT 3 UP 2
Horizontal Shrink

3.) $f(x) = 4^{-3x+12} + 1$

RIGHT 4 UP 1
Reflect over y -axis
Horizontal Shrink

4.) $f(x) = 4^{\frac{1}{2}x-2} + 3$

RIGHT 4 UP 3
Horizontal Stretch

5.) $f(x) = \frac{1}{3}(4)^{\frac{1}{3}x+3} - 4$

LEFT 9 DOWN 4
Vertical Shrink

6.) $f(x) = -4^{-2x+4} + 7$

RIGHT 2 UP 7
Reflect over x & y -axis
Horizontal Shrink

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

7.) $f(x) = \frac{1}{2}e^{2x+8} - 9$

LEFT 4 DOWN 9
Vertical Shrink
Horizontal Shrink

8.) $f(x) = -e^{\frac{1}{2}x+4} - 1$

LEFT 8 DOWN 1
Reflect over x -axis
Horizontal Stretch

9.) $f(x) = 4e^{-x+3} - 8$

RIGHT 3 DOWN 8
Reflect over y -axis
Vertical Stretch

10.) $f(x) = e^{\frac{1}{4}x+1} - 3$

LEFT 4 DOWN 3
Horizontal Stretch

11.) $f(x) = 2e^{x-5} - 10$

RIGHT 5 DOWN 10
Vertical Stretch

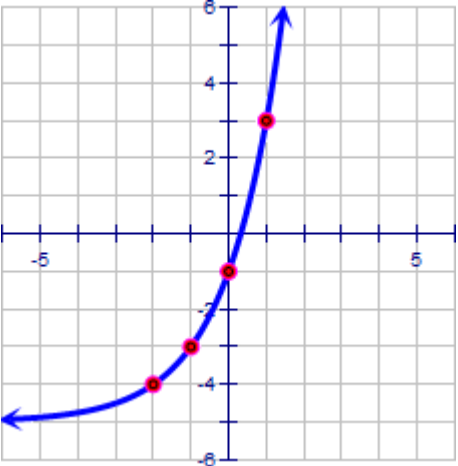
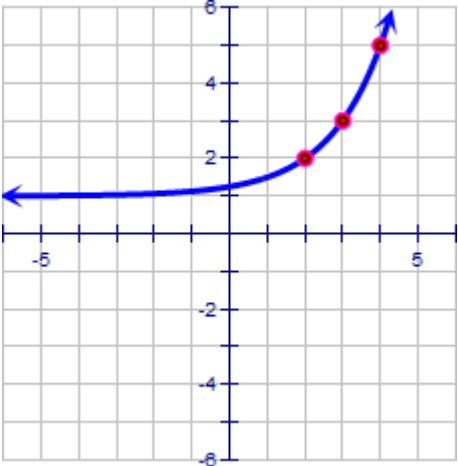
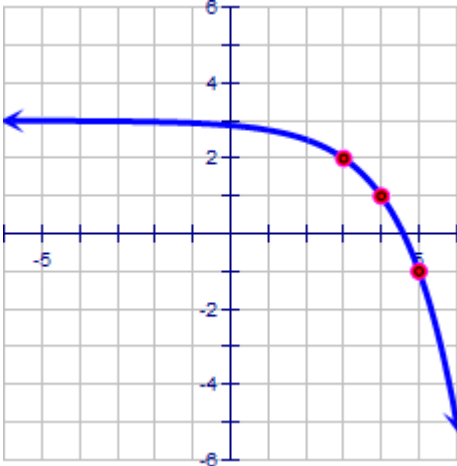
12.) $f(x) = e^{3x-6} + 4$

RIGHT 2 UP 4
Horizontal Shrink

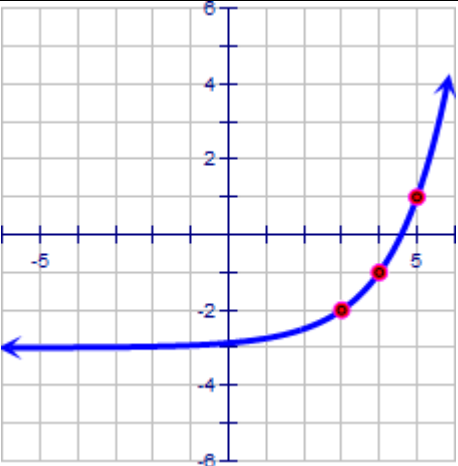
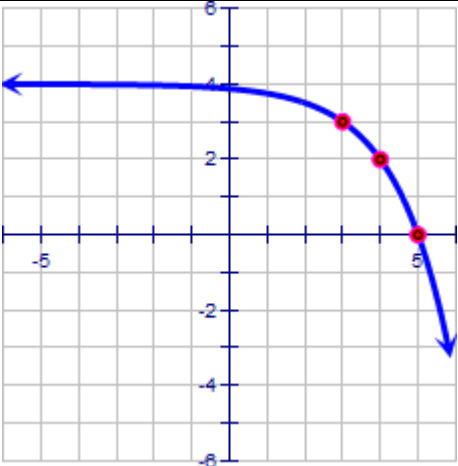
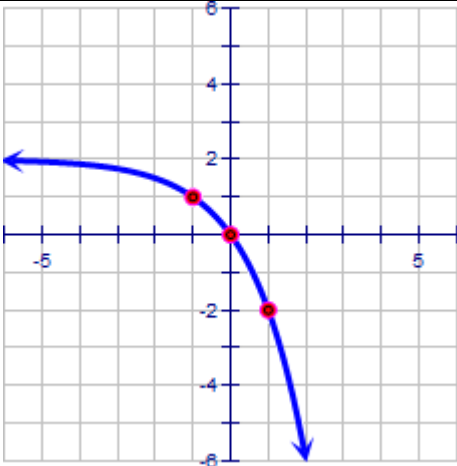
Directions: Compare each graph to $f(x) = 2^x$. Write the equation as well as a description of each transformation.

EQUATION	EQUATION	EQUATION
$f(x) = 2^{x+2} - 3$	$f(x) = -2^{x-2} + 5$	$f(x) = 2^{x-1} - 4$
DESCRIPTION	DESCRIPTION	DESCRIPTION
LEFT 2 DOWN 3	RIGHT 2 UP 5 Reflect over x-axis	RIGHT 1 DOWN 4

Directions: Compare each graph to $f(x) = 2^x$. Write a description of each transformation and graph each function.

		
EQUATION	EQUATION	EQUATION
$f(x) = 2^{x+2} - 5$	$f(x) = 2^{x-2} + 1$	$f(x) = -2^{x-3} + 3$
DESCRIPTION	DESCRIPTION	DESCRIPTION
LEFT 2 DOWN 5	RIGHT 2 UP 1	RIGHT 3 UP 3 Reflect over x-axis

Directions: Compare each graph to $f(x) = 2^x$. Write the equation and graph each function.

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