

TRANSFORMATIONS OF EXPONENTIAL FUNCTIONS

TRANSFORMATIONS OF EXPONENTIAL FUNCTIONS

Transformation	Graph shifts left	$f(x) + 5$	$f(x) + 200 + 5$
Horizontal Translation	Graph shifts right	$f(x) + 5$	$f(x) + 200 + 5$
Vertical Translation	Graph shifts up	$f(x) + 5$	$f(x) + 200 + 5$
Reflection	Flip over the y-axis	$f(-x)$	$f(-x) + 200 + 5$
Horizontal Stretch or Shrink	Graph stretches away from the y-axis	$f(x)$	$f(x)$
Vertical Stretch or Shrink	Graph stretches away from the x-axis	$af(x)$	$af(x) + 200 + 5$

Directions: Identify the transformation of each exponential function.

$g(x) = 2^x + 5$	1.
$g(x) = 2^{x-5}$	2.
$g(x) = 2\sqrt{x}$	3.
$g(x) = 100\% + 1$	4.
$g(x) = 10^x + 2$	5.
$g(x) = 2^x + 5$	6.

TRANSFORMATIONS OF EXPONENTIAL FUNCTIONS

Steps for Graphing Transformations of Exponential Functions:

- Step 1: Identify the parent function and its form.
- Step 2: Identify the transformations of the given function.
- Step 3: Create a table of values.
- Step 4: Plot the points on the graph and connect them with a smooth curve.

Directions: Graph each exponential function and identify the characteristics.

1. $g(x) = 4^{x-2} - 3$ Parent Function: $y = 4^x$

x	-2	-1	0	1	2
y	$2^{-4} = \frac{1}{16}$	$2^{-2} = \frac{1}{4}$	-2	1	13

Intercept: $(0, -2)$ Asymptote: $y = -3$
 Growth or Decay? Growth
 Transformation: vertical translation down 3 units
 Domain: all real numbers Range: $y > -3$ $(-3, \infty)$

2. $g(x) = 0.5^{3x}$ Parent Function: $y = \frac{1}{2}^x$

x	-2	-1	0	1	2
y	12	6	3	$\frac{3}{2}$	$\frac{3}{4}$

Intercept: $(0, 3)$ Asymptote: $y = 0$
 Growth or Decay? Decay
 Transformation: vertical stretch by a factor of 3
 Domain: all real numbers Range: $y > 0$ $(0, \infty)$

Teach your Algebra 2 students about transformations of exponential functions



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