

Practice Assignment

For the following functions, name all the transformations and then give the y-intercept, asymptote, and whether it is growth or decay:

Function	Transformations	$a + k$ Y-intercept	$y = k$ Asymptote	Growth/Decay
a. $y = 3(2)^x$	Stretch by 3	$y = 3(2)^0$ $(0, 3)$	$y = 0$	Growth $(2 > 1)$
b. $y = 5\left(\frac{1}{4}\right)^x - 4$	Stretch by 5 down 4	$y = 5\left(\frac{1}{4}\right)^0 - 4$ $(0, 1)$	$y = -4$	Decay $(0 < \frac{1}{4} < 1)$
c. $y = \frac{1}{2}(2)^x - 6$	Shrink by $\frac{1}{2}$ down 6	$y = \frac{1}{2}(2)^0 - 6$ $(0, -5.5)$	$y = -6$	Growth $(2 > 1)$
d. $y = -7\left(\frac{1}{3}\right)^x + 2$	reflect Stretch by 7 up 2	$y = -7\left(\frac{1}{3}\right)^0 + 2$ $(0, -5)$	$y = 2$	Decay $(0 < \frac{1}{3} < 1)$
e. $y = 2\left(\frac{1}{4}\right)^x$	Stretch by 2	$y = 2\left(\frac{1}{4}\right)^0$ $(0, 2)$	$y = 0$	Decay $(0 < \frac{1}{4} < 1)$
f. $y = \frac{1}{4}\left(\frac{3}{2}\right)^x + 1$	Shrink by $\frac{1}{4}$ up 1	$y = \frac{1}{4}\left(\frac{3}{2}\right)^0 + 1$ $(0, 1.25)$ $(0, 5/4)$	$y = 1$	Growth $(\frac{3}{2} > 1)$
g. $y = -3(5)^x + 4$	Reflect Stretch by 3 up 4	$y = -3(5)^0 + 4$ $(0, 1)$	$y = 4$	Growth $(5 > 1)$
h. $y = 4(2)^{x+3} - 6$	Stretch by 4 Down 6 Left 3	$y = 4(2)^{0+3} - 6$ $(0, 26)$	$y = -6$	Growth $(2 > 1)$
i. $y = 3\left(\frac{1}{2}\right)^{x-1} + 1$	Stretch by 3 up 1 right 1	$y = 3\left(\frac{1}{2}\right)^{0-1} + 1$ $(0, 7)$	$y = 1$	Decay $(0 < \frac{1}{2} < 1)$

Directions: For each of the following transformations, create a function that would represent those transformations. The base function is given for each set.

1. Base Function: $y = 2^x$

a. Up 5 units

$$y = 2^x + 5$$

b. Left 2 units

$$y = 2^{x+2}$$

c. Reflected over the x-axis and right 4 units

$$y = -2^{x-4}$$

2. Base Function: $y = \frac{1}{2}^x$

a. Down 6 units

$$y = \frac{1}{2}^x - 6$$

b. Shrunk by a factor of $\frac{1}{4}$

$$y = \frac{1}{4} \left(\frac{1}{2}\right)^x$$

c. Reflected over x-axis and stretch by factor of 3

$$y = -3 \left(\frac{1}{2}\right)^x$$

3. Base Function: $y = 0.4^x$

a. Right 2 units

$$y = 0.4^{x-2}$$

b. Reflected over x axis

$$y = -0.4^x$$

c. Up 4 units and left 7 units

$$y = 0.4^{x+7} + 4$$

Directions: For each of the following functions, describe the transformations:

a. $f(x) \rightarrow 2f(x)$

Stretch by factor
of 2

b. $f(x) \rightarrow f(x-3)$

right 3

c. $f(x) \rightarrow f(x) - 2$

down 2

d. $f(x) \rightarrow -\frac{3}{4}f(x)$

reflect
Shrink by $\frac{3}{4}$

e. $f(x) \rightarrow f(x+3) - 5$

left 3
down 5

f. $f(x) \rightarrow \frac{1}{2}f(x+2) + 1$

Shrink by $\frac{1}{2}$
left 2
up 1

g. $f(x) \rightarrow -f(x) + 9$

reflect
up 9

h. $f(x) \rightarrow 3f(x-6) + 4$

Stretch by 3
right 6
up 4