Warm Up

In your groups complete **both sides** of one of the transformations sheets.

Transformations of Exponential Functions

Lesson objectives

- I can identify the transformations of an exponential function
- I can graph the transformations of an exponential function
- I understand the changes the transformations make on the properties of the graph

1.1

Lesson objectives | Teachers' notes | Lesson notes

Nelson Page 251 #s 1, 2, 5, 7, 9 & 10

Example

Predict the changes to the graph. Test your theories on desmos!

$f(x) = 3^x$

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

HT right 1

VT up 4

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

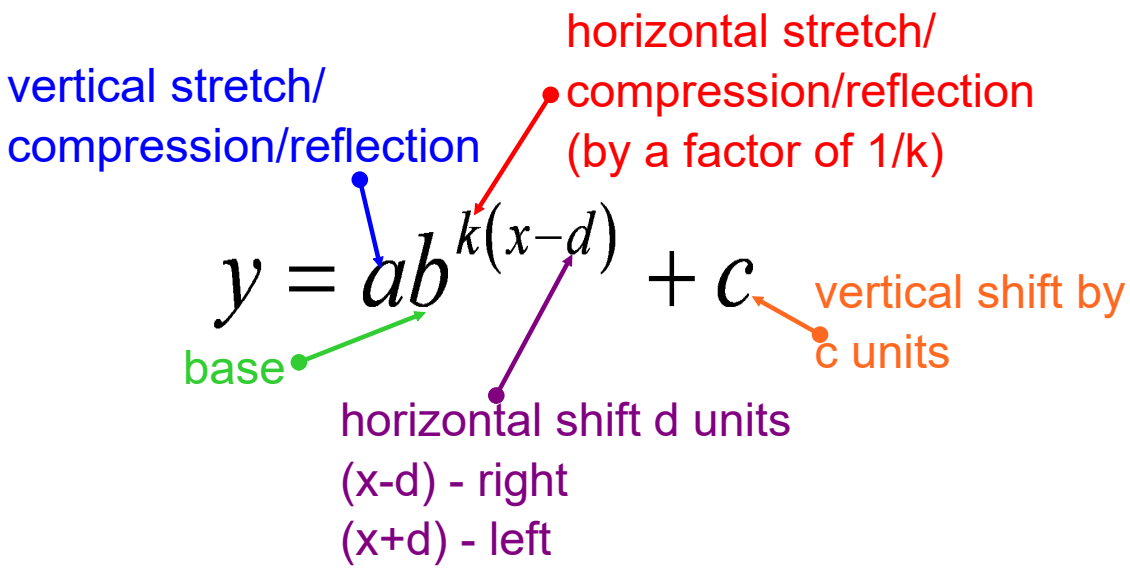
$g(x) = -2\left(\frac{1}{4}\right)^x - 1$

Reflect in x-axis

VS factor of 2

VT down 1

Transformations



Graphing Transformations

We have **TWO** anchor points to graph exponential functions, as well as the asymptote.

1. (0,1) 2. (1,b)

We can apply the transformations to these two points and the asymptote to sketch the graph.

1. (0,1) gives $\left(\left(\frac{1}{k}(0)+d\right), a(1)+c\right)$

2. (1,b) gives $\left(\left(\frac{1}{k}(1)+d\right), a(b)+c\right)$

asymptote = c

Example

State the transformations to each of the following functions.

$$y = 2(3)^{-x} + 1$$

VS factor of 2

Reflect in y-axis

VT up 1

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

Reflect in x-axis

HC factor of $\frac{1}{3}$

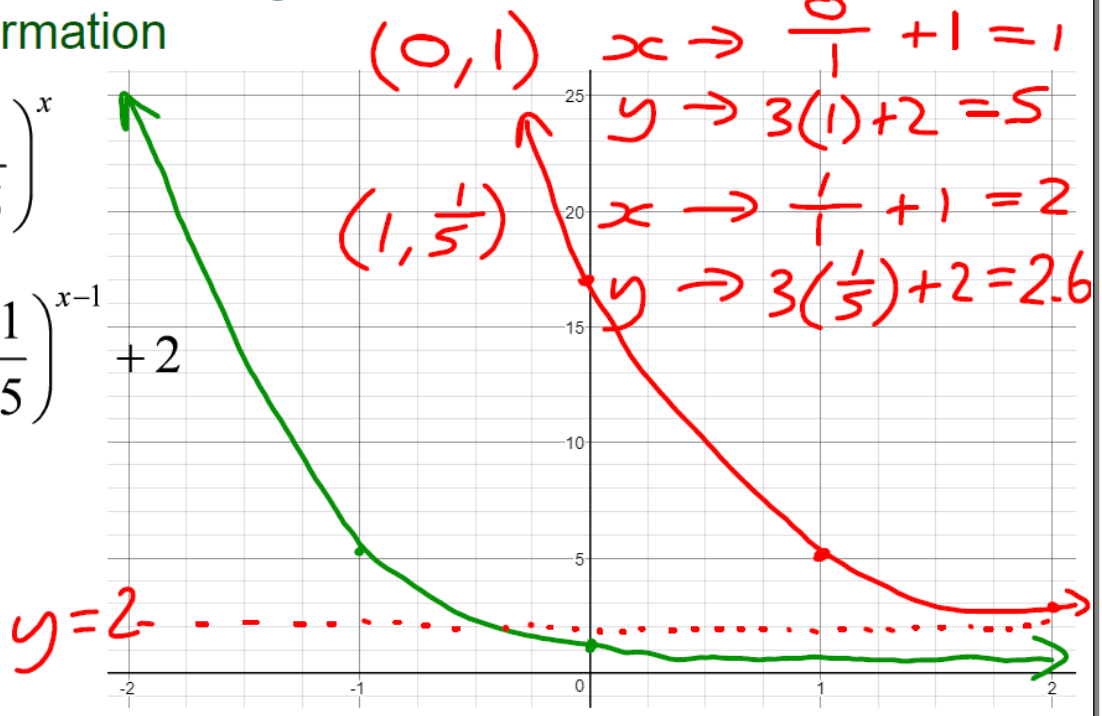
HT left 2

VT up 1

Example

Sketch the following base function and the transformation

- $y = \left(\frac{1}{5}\right)^x$
- $y = 3\left(\frac{1}{5}\right)^{x-1} + 2$



Example

Sketch the following base function and the transformation

- $y = \left(\frac{1}{5}\right)^x$
- $y = 3\left(\frac{1}{5}\right)^{x-1} + 2$