

Multiple Representations of Exponential Functions

Exponential functions can be represented in many ways: as equations, as tables, as graphs, or as word problems. Each representation describes the same pattern. Practice converting between the multiple representations of each exponential function.

Given a Table, Create an Equation and Word Problem to match.

1.

x	0	1	2	3
y	10	20	40	80

a. Write the equation $y = 10(2^x) = 10(2)^x$

b. Write a word problem Start with ~~10~~ ^{5 pairs of} bunnies who each have 1 pair each generation

2.

x	0	1	2	3	4	5
y	1	3	9	27	81	243

a. How did you find the initial value?

Work backwards by dividing by the growth factor.

b. Write the equation

$$y = 1(3)^x$$

c. Write a word problem

Start with 1 pair of bunnies and each pair has 2 pairs of babies each generation.

3.

x	0	3	6	9	12
y	400	200	100	50	25

a. How did you find the growth rate?

Divide y-values: $\frac{100}{200} = \frac{1}{2}$, $\frac{50}{100} = \frac{1}{2}$

b. Write the equation

$$y = 400\left(\frac{1}{2}\right)^{\frac{x}{3}} \leftarrow \text{Took 3 steps to halve}$$

c. Write a word problem

I start 400 ~~feet~~ ^{inches} from a wall. Every 3 seconds, I move halfway toward the wall.

Given a Graph, find the Equation

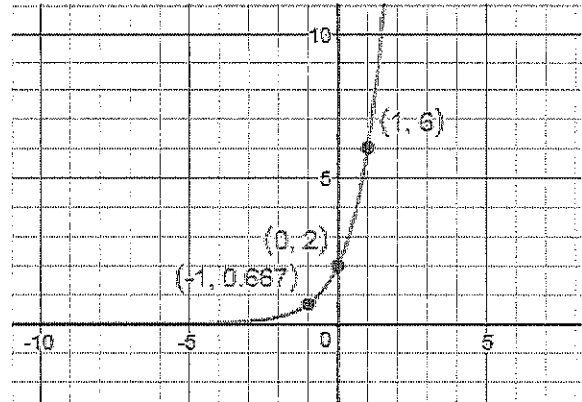
1.

a. Equation:

$$y = 2(3)^x$$

b. This graph was translated vertically by 5 to create $t(x)$. Write the transformed function, $t(x)$.

$$t(x) = 2(3)^x + 5$$



2.

a. Equation:

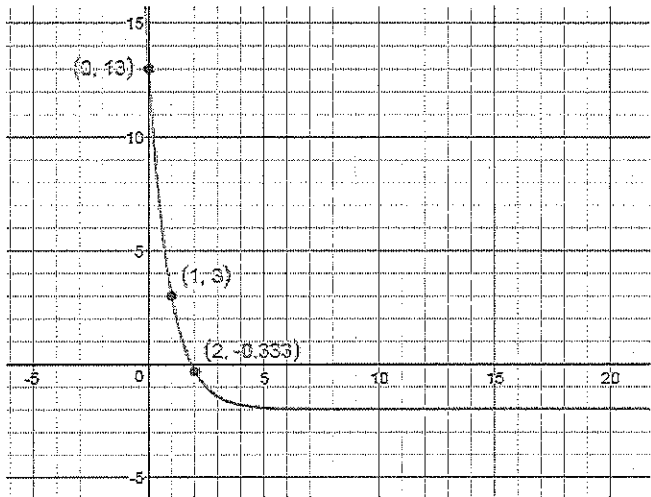
$$y = 15\left(\frac{1}{3}\right)^x - 2$$

b. How did the horizontal asymptote show up in your equation?

As the vertical shift.

c. This graph was reflected over the x -axis, then shifted left 4 units to create $s(x)$. Write the transformed function, $s(x)$.

$$s(x) = -15\left(\frac{1}{3}\right)^{x+4} + 2$$



3.

a. Equation:

$$y = -2(5)^x + 3$$

b. What part of the equation makes the graph point down?

The -2.

c. This graph was reflected over the y -axis, then shifted up 2 units to create $r(x)$. Write the transformed function, $r(x)$.

$$r(x) = -2(5)^{-x} + 5$$

