

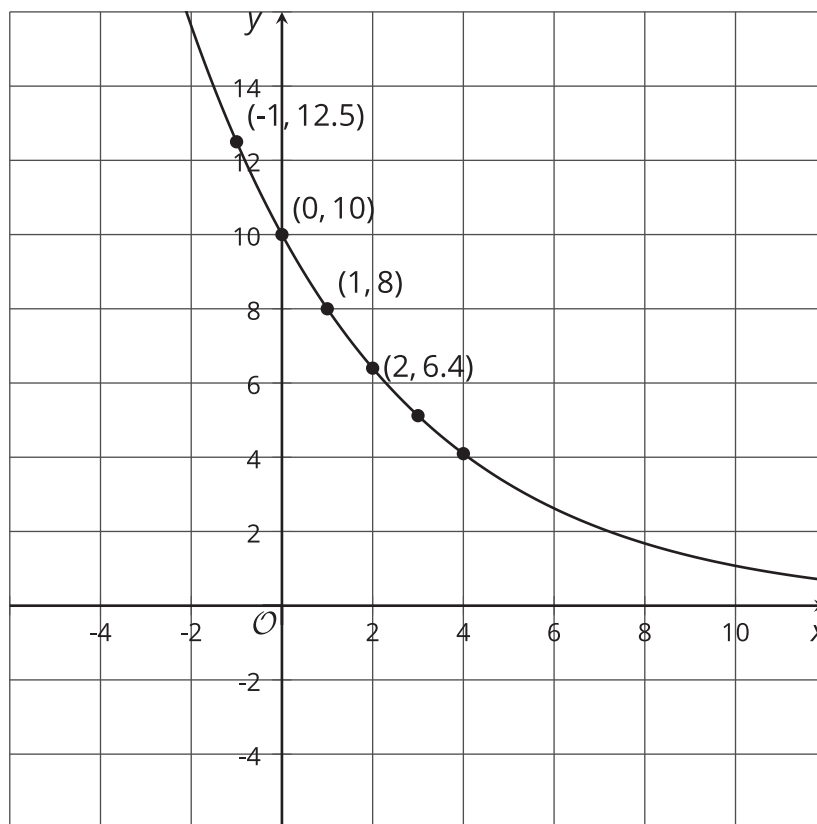


# Representations of Exponential Functions

Let's get information about a function from its graph.

## 13.1 Worked Example: What's the Line?

What is the equation for this graph?



Step 1:

This looks like an exponential equation, so it has a vertical intercept and growth factor.

Step 2:

The graph includes the point  $(0, 10)$ , which is the vertical intercept.

Step 3:

$8 \div 10 = 0.8$ ,  $6.4 \div 8 = 0.8$ ,  $10 \div 12.5 = 0.8$ , the growth factor is 0.8.

Step 4:

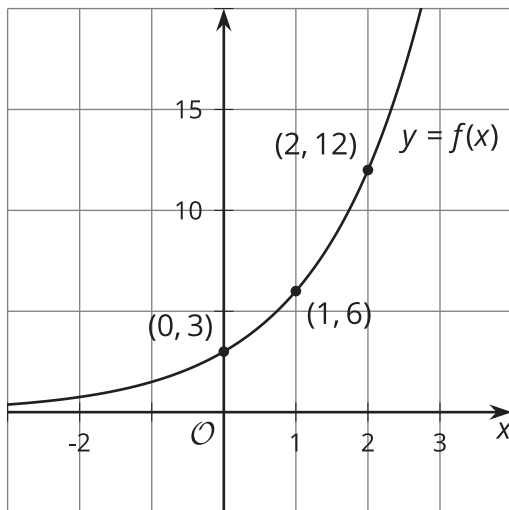
The equation is  $y = 10 \cdot 0.8^x$ .



## 13.2

## Interrogating Function Representations

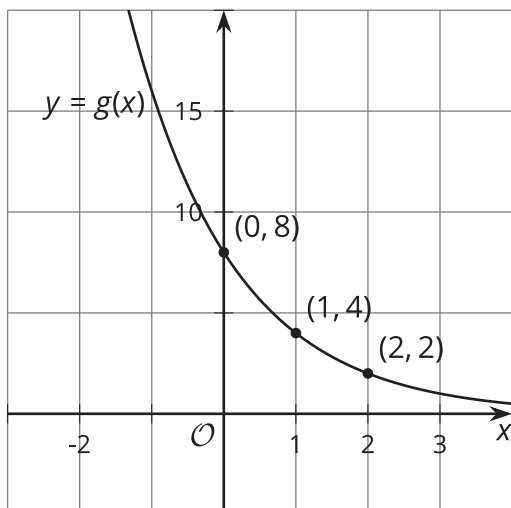
1. Consider the graph of  $f(x) = 3 \cdot 2^x$  and the corresponding table.



| $x$ | $f(x)$ |
|-----|--------|
| 0   | 3      |
| 1   | 6      |
| 2   | 12     |

- Using the first two points, what is the growth factor?
- Using the second two points, what is the growth factor?
- Where do you see this growth factor in the equation?
- Where do you see the growth factor on the graph?
- What is the vertical intercept of the graph?
- How can you tell from the equation that this is the vertical intercept?

2. Consider the graph of  $g(x) = 8 \cdot \left(\frac{1}{2}\right)^x$  and corresponding table.



| $x$ | $g(x)$ |
|-----|--------|
| 0   | 8      |
| 1   | 4      |
| 2   | 2      |

- Using the first two points, what is the growth factor?
- Using the second two points, what is the growth factor?
- Where do you see this growth factor in the equation?
- Where do you see the growth factor on the graph?
- What is the vertical intercept of the graph?
- How can you tell from the equation that this is the vertical intercept?

# 13.3

## Matching Representations of Exponential Functions

1. Match each function with the graph that represents it.

$$a(t) = 300 \cdot 2^t$$

$$b(t) = 300 \cdot 3^t$$

$$c(t) = 300 \cdot \left(\frac{1}{2}\right)^t$$

$$d(t) = 300 \cdot \left(\frac{1}{3}\right)^t$$

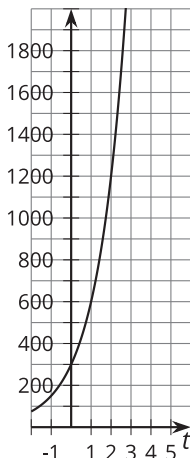
$$e(t) = 108 \cdot 2^t$$

$$f(t) = 108 \cdot 3^t$$

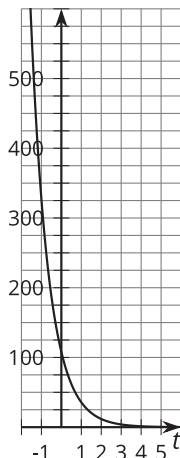
$$g(t) = 108 \cdot \left(\frac{1}{2}\right)^t$$

$$h(t) = 108 \cdot \left(\frac{1}{3}\right)^t$$

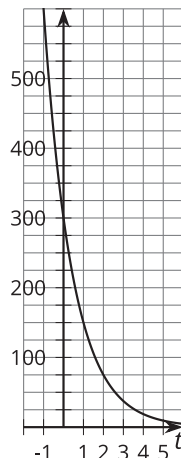
graph 1



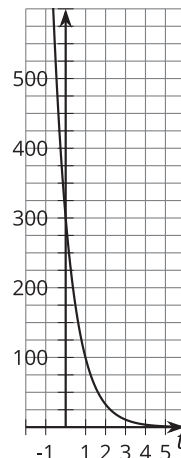
graph 2



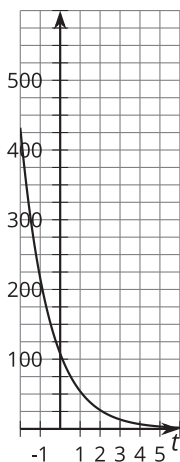
graph 3



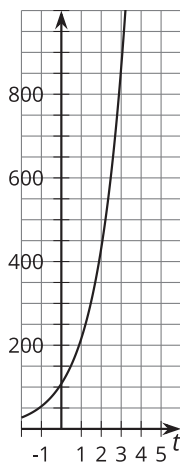
graph 4



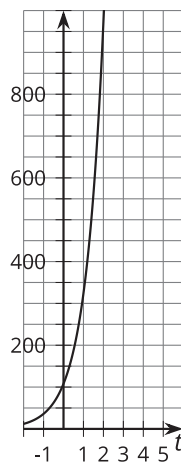
graph 5



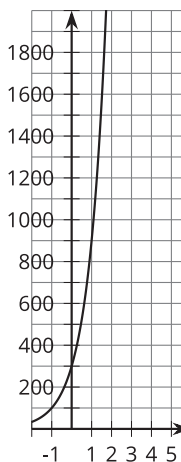
graph 6



graph 7



graph 8



2. On two of the graphs, show where you can see the vertical intercepts: 108 and 300.
3. On four of the graphs, show where you can see the growth factors:  $\frac{1}{3}$ ,  $\frac{1}{2}$ , 2, and 3.