

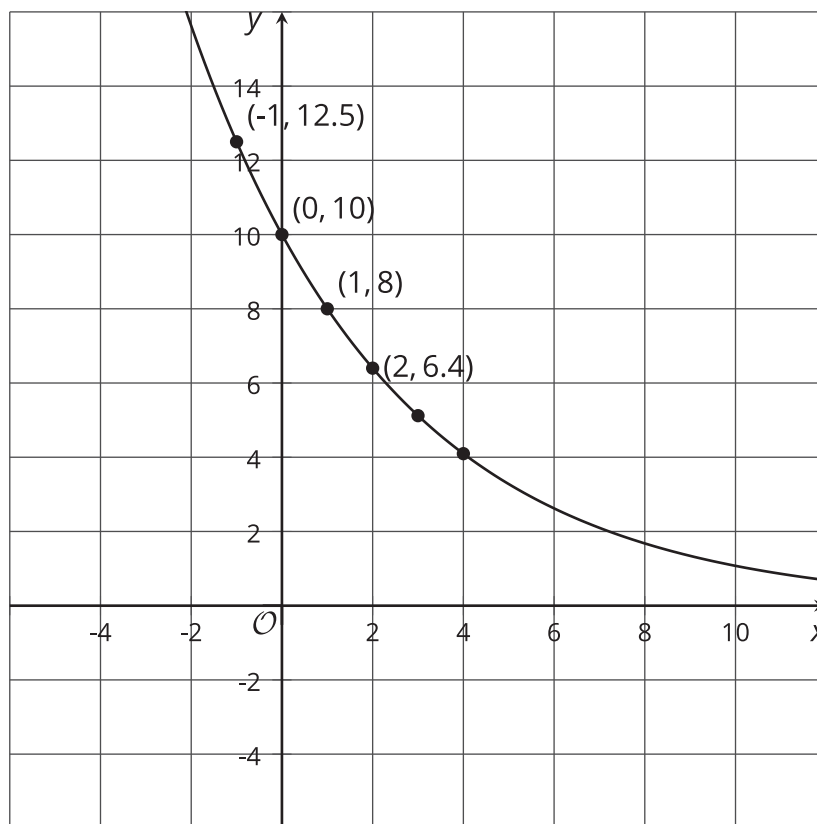


Representations of Exponential Functions

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:

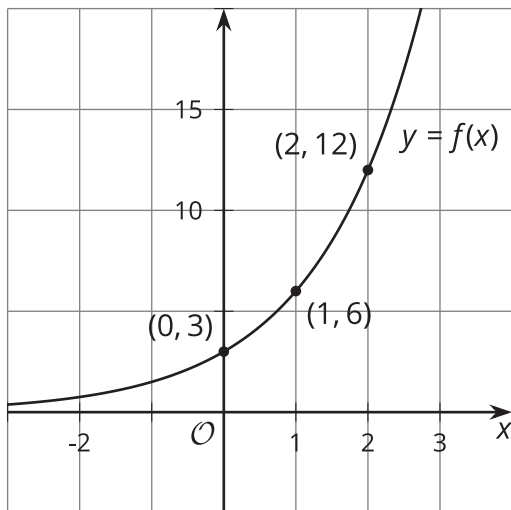
The equation is $y = 10 \cdot 0.8^x$.



13.2

Interrogating Function Representations

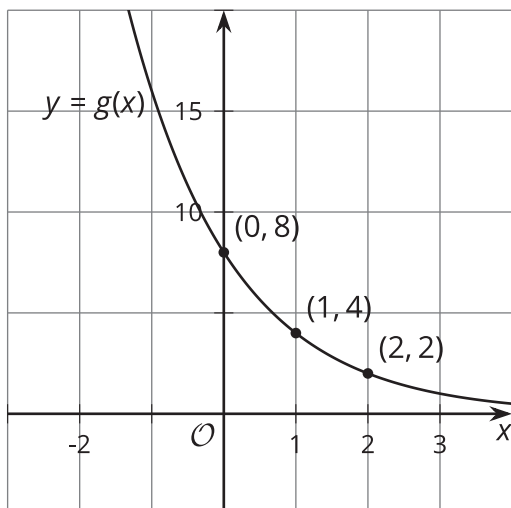
1. Consider the graph of $f(x) = 3 \cdot 2^x$ and the corresponding table.



| 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.

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

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

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

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

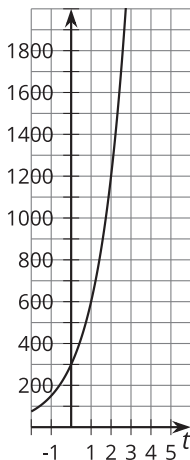
$$e(t) = 108 \cdot 2^t$$

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

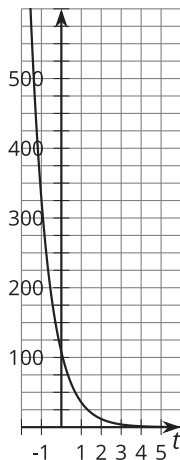
$$g(t) = 108 \cdot \left(\frac{1}{2}\right)^t$$

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

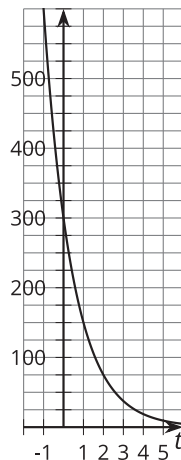
graph 1



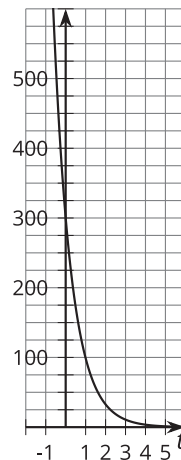
graph 2



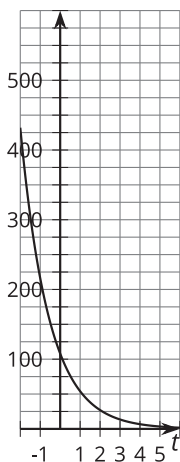
graph 3



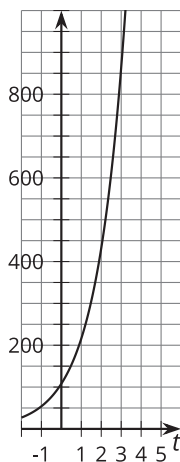
graph 4



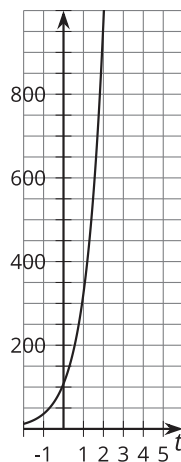
graph 5



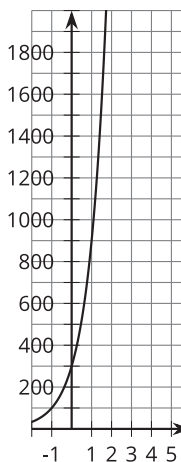
graph 6



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.