6.2 Exponential Functions

Monday, September 23, 2019 7:46 AM

Warm Up

Determine whether the equation represents a linear function. Explain.

1. $y = \sqrt{2x + 3}$

2. $y = 2x^3 - 3x + 2$

3. $y = x + 1$

4. $y = x^2 - 1$

5. $y = 1 - \frac{1}{2}x$

6. $y = \frac{1}{2}x - 3$

Essential Question

What are the characteristics of exponential functions?

Needed Vocab:

- **Asymptote**
- **Constant Ratio**
- **Exponential Function**

Goal: "I can. . .

Describe and graph exponential functions."

Work with a partner. Copy and complete each table for the exponential function $f(x) = 2^x$. In each table, what do you notice about the values of x? What do you notice about the values of y?

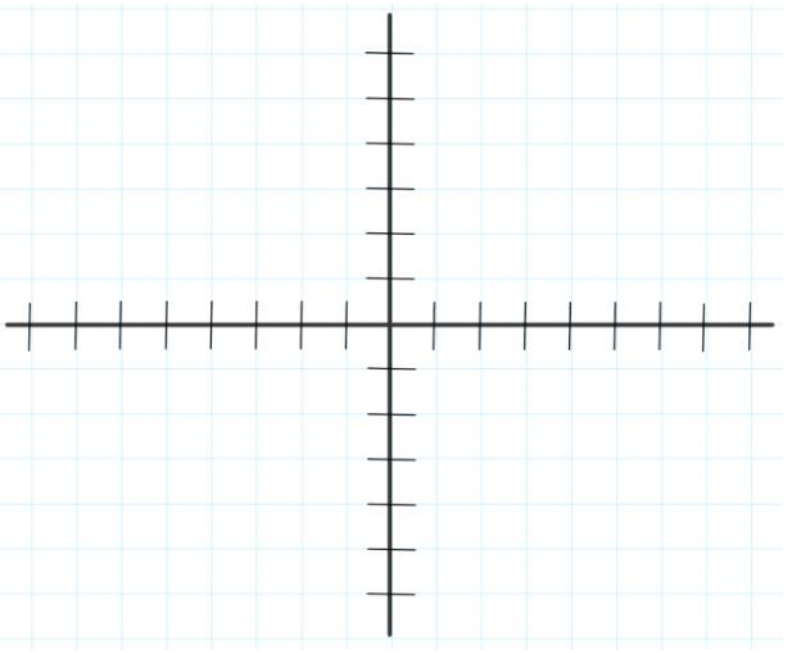
x	$y = (2)^x$
1	
2	
3	
4	
5	

x	$y = (2)^x$
2	
4	
6	
8	
10	

Example 1

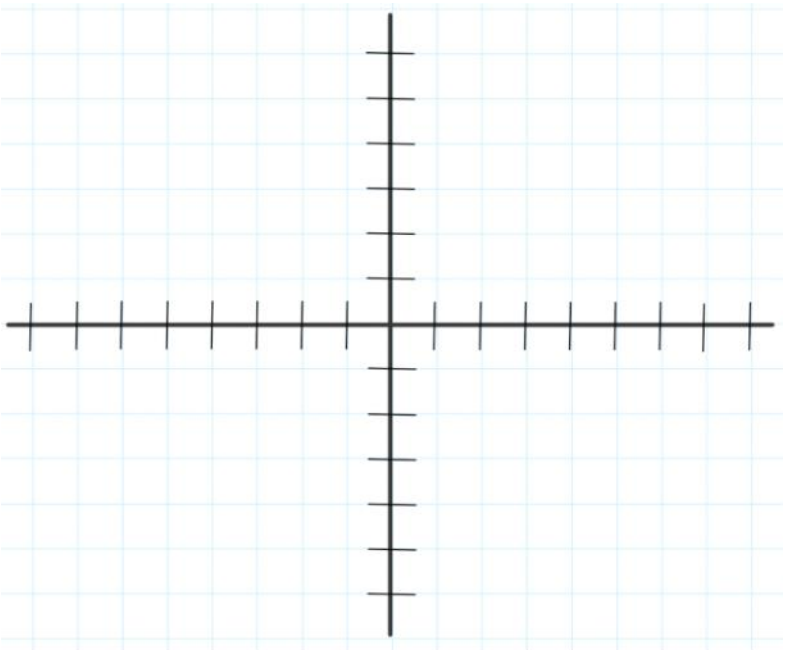
A. What does the graph of $f(x) = 2^x$ look like?

B. What are the characteristics of the graph of $f(x) = 2^x$?



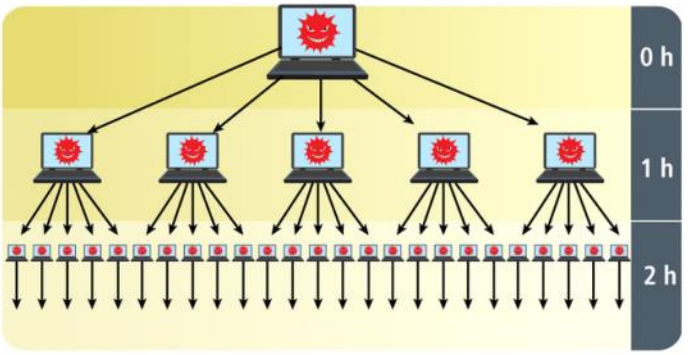
What are the key features to the graph of $f(x) = \frac{1}{2}^x$?

What are the key features to the graph of $f(x) = 3^x$?



Example 2

A network administrator uses the function $f(x) = 5^x$ to model the number of computers a virus spreads to after x hours. If there are 1,000 computers on the network, about how many hours will it take for the virus to spread to the entire network?



How long would it take that same virus to spread to 50,000 computers?

Exponential Functions

An **exponential function** is the product of an initial amount and a **constant ratio** raised to a power. Exponential functions are modeled using $f(x) = a \cdot b^x$, where a is a nonzero constant, $b > 0$, and $b \neq 1$.

$$f(x) = a \cdot b^x$$

a is the initial amount.

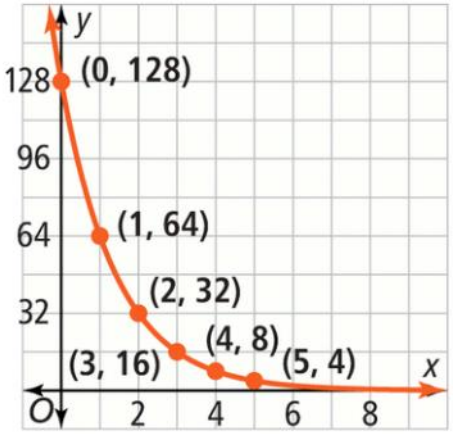
b is the constant ratio.

Example 3

A. What is the written form of the function represented by the table?

x	$f(x)$
0	4
1	12
2	36
3	108
4	324

B. What is the written form of the function represented by the graph?



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3. Write an exponential function for each set of points.

a. $(0,\ 3)$, $(1,\ 12)$, $(2,\ 48)$, $(3,\ 192)$, and $(4,\ 768)$

b. $(0,\ 2{,}187)$, $(1,\ 729)$, $(2,\ 243)$, $(3,\ 81)$, and $(4,\ 27)$

Example 4

Talisha is offered two pledge options for donating to a charity.
Which option will increase the pledge amount faster over time?

Option A: \$100 for the first week, and each week after that the amount increases by \$25

Option B: \$1 for the first week, and each week after that the amount triples

4. Identify each function as linear or exponential. Explain.

a. $f(x)$ equals the number of branches at level x in a tree diagram, where at each level each branch extends into 4 branches.

b. $f(x)$ equals the number of boxes in row x of a stack in which each row increases by 2 boxes.

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https://tinyurl.com/thhafou

Homework

Pg. 229
9, 15-25, 29, 30