Assignment

Write

Write a definition for *horizontal asymptote* in your own words using an exponential function as an example.

Remember

All sequences are functions, and some geometric sequences are exponential functions.

The form of an exponential function is $f(x) = a \cdot b^x$, where a and b are real numbers and $b > 0$, but $b \neq 1$. The a-value represents the y-intercept and the b-value represents the constant ratio, or constant multiplier.

Practice

In an experiment for the science fair at your school, you record the following data for the death phase of bacterial growth.

Time since beginning of death phase (in hours)	Number of bacteria	Number of bacteria
0	4000	$4000\left(\frac{1}{2}\right)^0$
1	2000	
2	1000	
3	500	
4	250	

1. Assuming that the bacterial growth continues in this manner, how many bacteria will there be five hours after the beginning of the death phase?
2. Based on the expression for the 4000 bacteria in the first row of the table, write an expression for each number of bacteria. Record your results in the third column of the table.
3. Write a function that gives the bacterial growth in terms of time. Let y represent the number of bacteria and let x represent the amount of time in hours.
4. Create a graph that shows the bacterial growth as a function of time.
5. What is the y-intercept of $y = 4000 \cdot 2^{-x}$? What does the y-intercept represent in the problem situation? Use a complete sentence in your answer.
6. Identify the horizontal asymptote on the graph. Describe what the horizontal asymptote means in this problem situation.

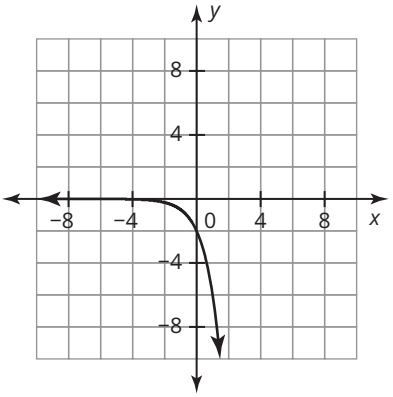
Stretch

Which of the functions does not fit with the others? Explain your answer.

A. The exponential function that goes through (0, −3) and (5, 296).

B. $f(x) = -1 \cdot 6^x$

C.

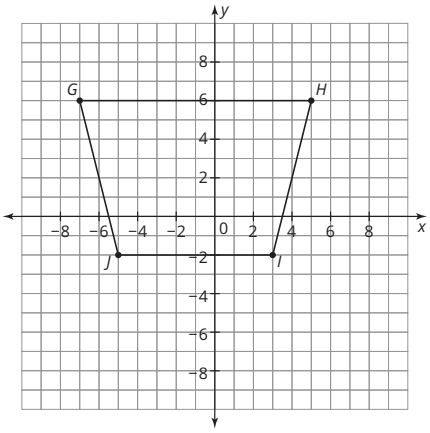


D.

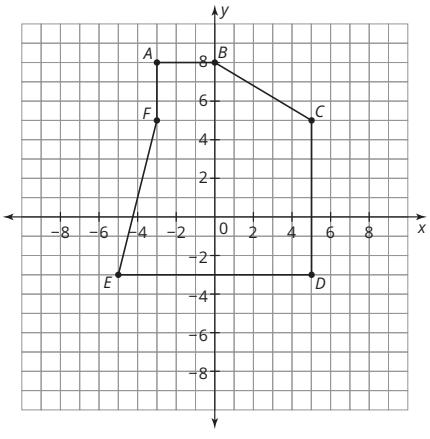
x	y
1	$\frac{2}{3}$
2	$\frac{2}{9}$
3	$\frac{2}{27}$

Review

1. Determine the perimeter of trapezoid *GHIJ*. Round your answer to the nearest hundredth, if necessary.



2. Determine the area of composite figure *ABCDEF*. Round your answer to the nearest hundredth, if necessary.



3. Solve each system of linear equations.

a. $\begin{cases} y = -5x - 21 \\ -2x + 5y = -24 \end{cases}$

b. $\begin{cases} 8x - 3y = 4 \\ 7x - 10y = -26 \end{cases}$