

Name:

Unit 6 Day 20  
Exponential Growth & Decay



1. A company starts with 50 employees and increases by 50% after one year. It continues to grow at the same rate for the next 4 years. How many employees does it have after 4 years?

a. Write an exponential growth model for this situation.

$$y = 50(1 + .50)^t$$

b. Calculate the number of employees after 4 years.

$$y = 50(1.50)^4$$

$\sim 253$  employees

2. The average value of a single family home in Hinsdale, IL in 2000 was \$490,000. The value of the home increase at a rate of about 6.7% per year.

a. Write a function that models the value of the home over time.

$$y = 490,000(1 + .067)^t$$

b. Find the average value of the house in 2012.

$$t = \frac{2012 - 2000}{12} \text{ years}$$

$$y = 490,000(1.067)^{12}$$

\$1,067,011.53

3. When you drive a New car out of a dealership it instantly begins to lose value. The value of a car will decrease at a rate of 15.5% annually.  $15.5\% \rightarrow .155$

a. Write a function that models the value a car over time. (think about what you DON'T know)

$$y = C(1 - .155)^t$$

b. If you bought a new car in 2010 for \$25000 and wanted to resell in in 2014, how much would expect it to be worth?

$$t = \frac{2014 - 2010}{4} \text{ years}$$

$$y = 25,000(.845)^4$$

\$12,745.79

4. In 1985 there were 285 cell phone subscribers in the small town of Centerville. The number of subscribers increased by 75% per year after 1985.

a. Write a function that models how many cell phone subscribers there were over time.

$$y = 285(1 + .75)^t$$

b. How many Cell phone subscribers were in Centerville in 1994?

$$\frac{1994 - 1985}{9}$$

$$y = 285(1.75)^9$$

$y = 43,871$

Name:

(#5-8) Determine if the following are equations represent growth or decay.

5.  $y = 0.2\left(\frac{3}{4}\right)^x$

decay

6.  $y = (1.2)^x$

growth

7.  $y = 3 \cdot \left(\frac{5}{4}\right)^x$

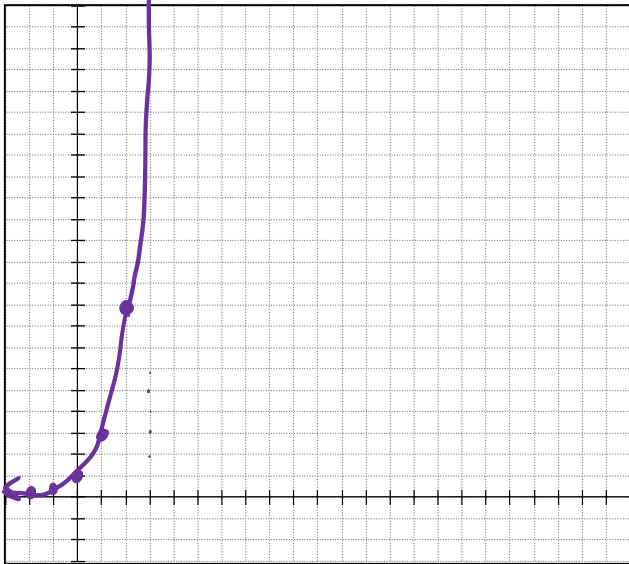
growth

8.  $y = \left(\frac{3}{2}\right)^{-x}$   
 $\left(\frac{2}{3}\right)^x$   
decay

(#9-10) Complete the table and sketch a graph of each function described below.

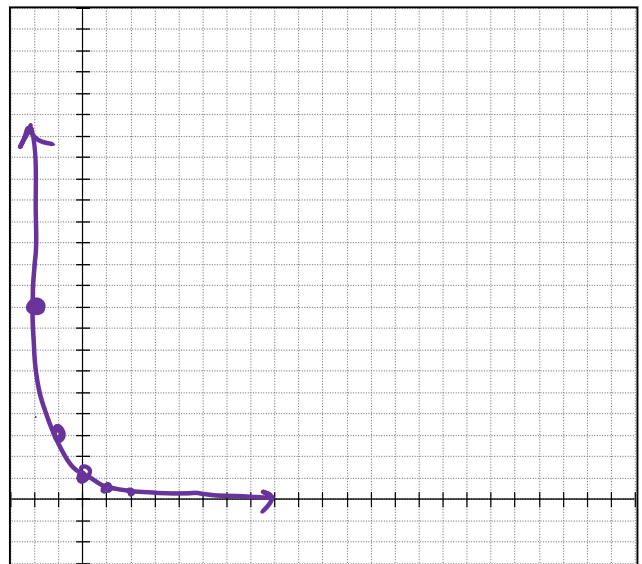
9. Function:  $y = 3^x$

X	-2	-1	0	1	2	3
Y	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9	27



10. Function:  $y = \left(\frac{1}{3}\right)^x$

x	-2	-1	0	1	2	3
y	9	3	1	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{27}$



Decide if the following tables are exponential or linear.

X	-1	0	1	2	3
Y	-12	-2	8	18	28

+10 +10 +10  
linear growth

X	-2	-1	0	1	2
Y	8	24	72	216	648

x3  
exp growth