

find  
b

1. Use each percent change to find the base of an exponential equation.

a) 46% Increase  $b = 1.46$       b) 18.03% decrease  $b = 0.8197$   
 $100\% + 46\% = 146\%$        $100 - 18.03 = 81.97\%$

2. For each exponential equation find the percent change and state if it is an increase or a decrease.

a)  $y = 4500(0.306)^x$       b)  $y = 1.025(1.219)^x$   
 % change =  $\rightarrow 69.4\%$  decrease       $1.219 \times 100 = 121.9\%$   
 $0.306 \times 100 = 30.6$        $121.9\% - 100\% = 21.9\%$  increase

3. Tell if each exponential equation represents Growth or Decay.

a)  $y = 920(0.99985)^x$       b)  $y = 57\left(\frac{156}{150}\right)^x$       c)  $y = 2.1(1.34)^{-x}$   
 decay      growth      decay exp.

4. The number of foreclosures has been decreasing 1.3% each year. In 2010 there were 1,300,000 foreclosures.

a) Model this situation with an exponential equation.  $b = 100 - 1.3 = 98.7\%$   
 $y = 1,300,000(0.987)^x$        $= 0.987$

b) Find the number of foreclosures in 2016.  
 $= 1,300,000(0.987)^6$       2010  $\rightarrow$  2016  
 $x = 6$  years       $1,201,838$

c) Find the number of foreclosures in 2005.  
 $= 1,300,000(0.987)^{-5}$       back 5 years  $x = -5$        $1,387,898$

5. The value of a painting has been increasing 4.9% each year. The painting was valued at \$35,000 in 2012.

a) Model this situation with an exponential equation.  
 $b = 100 + 4.9 = 104.9\%$   
 $y = 35000(1.049)^x$        $= 1.049$

b) Find the value of the painting in 2004.  
 $= 35000(1.049)^{-8}$       back 8 yrs from 2012  $x = -8$        $\$23,870.64$

c) Find the value of the painting in 2019.  
 $= 35000(1.049)^7$       2012  $\rightarrow$  2019  $x = 7$        $\$48,921.12$

6. The number of cells of a certain virus double every 10 minutes. At 8:00 am there were 20 bacteria.

a) Model this situation with an exponential equation.  
 $y = 20(2)^x$        $b = 2$

b) Find the number cells at 2:30pm that same day.

8am - 2:30pm  $\rightarrow 6.5$  hrs  
 $\times 60$  mins =  $390$  mins

$y = 20(2)^{39}$   
 $= 1.0995116 \times 10^{13}$

$\frac{390}{10}$   
 $= 39$   
 $= x$