

1.) An equation that models the number of bacteria cell growth is represented by $f(x) = 500(1.30)^x$, where x is the time in *days*.

a. What was the initial amount of bacteria cells, before the growth began?

500

b. By what percent, did the bacteria increase each *day*?

30%

c. In terms of *hourly* rate of growth, write an equation that represents the growth of bacteria cells.

$$y = 500(1.30)^{\frac{24}{24}x}$$

$$y = 500\left(1.30^{\frac{1}{24}}\right)^{24x}$$

$$y = 500(1.011)^{24x}$$

d. By what percent, did the bacteria increase each *hour*? [Round to the nearest tenth]

.011

1.1%

2.) A study of the annual population of the red-winged blackbird in Ft. Mill, S.C., shows the population, $B(t)$, can be represented by the function $B(t) = 750(1.16)^t$, where t represents the number of *years* since the study began. In terms of the *monthly* rate of growth, the population of red-wings blackbirds can be best approximated by the function

(a) $B(t) = 750(1.012)^t$

$$B(t) = 750(1.16)^{\frac{12}{12}t}$$

(b) $B(t) = 750(1.012)^{12t}$

$$B(t) = 750\left(1.16^{\frac{1}{12}}\right)^{12t}$$

(c) $B(t) = 750(1.16)^{12t}$

(d) $B(t) = 750(1.16)^{\frac{t}{12}}$

$$B(t) = 750(1.012)^{12t}$$

3.) After an oven is turned on, its temperature, T , in degrees Fahrenheit, is represented by the equation: $T = 80(1.11)^m$, where m is the number of **minutes** after the oven is turned on.

a. By what percent, did the temperature increase each *minute*?

11%

b. In terms of rate of growth per *second*, write an equation that represents the temperature increase.

$$T = 80(1.11)^{\frac{60}{60}m}$$

$$T = 80\left(1.11^{\frac{1}{60}}\right)^{60m}$$

$$T = 80(1.0017)^{60m}$$

c. By what percent, did the temperature of the oven increase each *second*?
[Round to the nearest hundredth.]

.0017

.17%

4.) Does $y = (4)^{-2x}$ represent exponential growth or decay? What is the percent rate of change?

~~(A) exponential growth of 4%~~

(B) exponential decay of 93.75%

~~(C) exponential growth of 83.5%~~

(D) exponential decay of 6.25%

$$y = \left(\frac{1}{16}\right)^x$$

$$y = (-0.0625)^x$$

$$1 - r = .0625$$

$$r = .9375$$