Algebra 1 Bellwork Friday, March 6, 2015

1. The health care expensed of a company has been increasing 13% each year. In 2004 the expenses were $52,000.

a) Model this situation with an exponential equation.

b) Find the healthcare costs of this company in 2015.

2. The deer population in a rural area has been decreasing 3.06% each year. In 2011 the deer population was estimated to be 8,400.

a) Model this situation with an exponential equation.

b) Find the deer population in 2005.

3. The number of bacteria cells doubles every 12 minutes. At 10:00 am there 70 cells.

a) Model this situation with an exponential equation.

b) Find the number of bacteria cells at 2:00 pm.

4. The half-life of a radioactive substance is 40 mintues. At 5:00pm there was 200 grams of this substance.

a) Model this situation with an exponential equation.

b) Find the amount of radioactive substance remaining at 7:30 pm. Round to the nearest hundredth.

5. You invest $7500 into an account that pays 8% annual interest.

a) Find the amount of interest you will have earned after one year.

b) How much money will you have after 5 years?

c) Find the amount of interest that you will have earned after 7 years.

d) In how many years will you first have $100,000?

Algebra 1 Bellwork Friday, March 6, 2015 ANSWERS

1. The health care expensed of a company has been increasing 13% each year. In 2004 the expenses were $52,000.

a) Model this situation with an exponential equation.

$y = 52{,}000(1.13)^x$

b) Find the healthcare costs of this company in 2015.

$x = 11$ $\quad y = 52{,}000(1.13)^{11} = \$199{,}464.78$

2. The deer population in a rural area has been decreasing 3.06% each year. In 2011 the deer population was estimated to be 8,400.

a) Model this situation with an exponential equation.

$y = 8400(.9694)^x$

b) Find the deer population in 2005.

$x = -6$ $\quad y = 8400(.9694)^{-6} = 10{,}122$ deer

3. The number of bacteria cells doubles every 12 minutes. At 10:00 am there 70 cells.

a) Model this situation with an exponential equation.

$y = 70(2)^x$

b) Find the number of bacteria cells at 2:00 pm.

10:00am to 2:00pm = 4 hrs × 60 = 240 min $\quad x = \frac{240 \text{ min}}{12 \text{ min}} = 20$ $\quad y = 70(2)^{20} = 73{,}400{,}320$ cells

4. The half-life of a radioactive substance is 40 mintues. At 5:00pm there was 200 grams of this substance.

a) Model this situation with an exponential equation.

$y = 200(.5)^x$

b) Find the amount of radioactive substance remaining at 7:30 pm. Round to the nearest hundredth.

5:00pm to 7:30pm = 2.5 hrs × 60 = 150 min $\quad x = \frac{150 \text{ min}}{40 \text{ min}} = 3.75$ $\quad y = 200(.5)^{3.75} = 14.87$ g

5. You invest $7500 into an account that pays 8% annual interest.

a) Find the amount of interest you will have earned after one year.

$7500(.08) = \$600$ OR $7500(1.08)^1 = 8100 \rightarrow 8100 - 7500 = 600$

b) How much money will you have after 5 years?

$y = 7500(1.08)^5 = \$11{,}019.96$

c) Find the amount of interest that you will have earned after 7 years.

amount $ after 7yrs $= 7500(1.08)^7 = 12{,}853.68 - 7500 = \$5353.68$ in interest

d) In how many years will you first have $100,000?

Between 33 & 34 yrs