Name: _____   Date: _____

Common Core Algebra 9H - Exponential Growth/Decay   HW #81
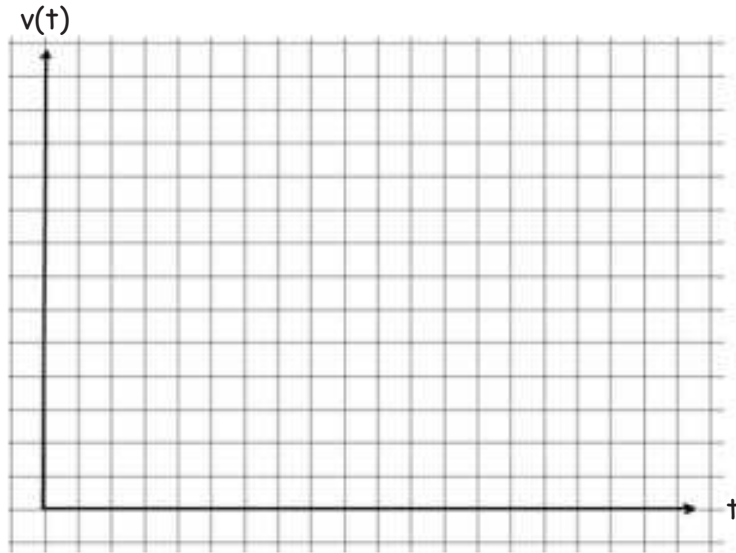
1. From 2000 to 2013, the value of the U.S. dollar has been shrinking. The value can be modeled by the following formula: $v(t) = 1.36\,(0.9758)^t$, where t is the number of years since 2000.

   a. How much was a dollar worth in the year 2005?

   b. Graph the points $(t, v(t))$, for integer values of $0 \le t \le 14$. Scale your y-axis appropriately. Label both axes.

   v(t)

   c. When did the value of the dollar fall below $1.00? _____

2. A construction company purchased some equipment costing $300,000. The value of the equipment depreciates (decreases) at a rate of 14% per year.
   a. Write a formula that models the value of the equipment.

   _____

   b. What is the value of the equipment after 9 years? _____

   c. Graph the points $(t, v(t))$ for integer values of $0 \le t \le 15$. Scale your y-axis appropriately. Label both axes.
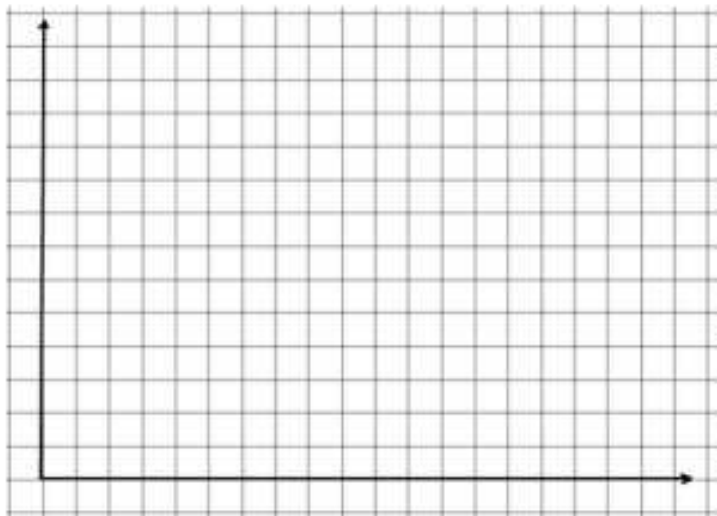
   d. When will the equipment have a value of $50,000?

   _____

3. Doug drank a soda with 130 mg of caffeine. Each hour, the caffeine in the body diminishes by about 12%.

    a.   Write a formula to model the amount of caffeine remaining in Doug's system.

    b.   How much caffeine remains in Doug's system after 2 hours?

    c.   How long will it take for the level of caffeine in Doug's system to drop below 50 mg?

4. 64 teams participate in a softball tournament in which half the teams are eliminated after each round of play.

    a.   Write a formula to model the number of teams remaining after any given round of play.

    b.   How many teams remain in play after 3 rounds?

    c.   How many rounds of play will it take to determine which team wins the tournament?

Mixed Review:

1. Solve the following system: $\begin{array}{l} 7x+2y=16 \\ -21x-6y=24 \end{array}$

2. Is the sum of 4.8 and $\sqrt{5}$ rational or irrational? Justify your answer.