Math 1 Unit 1 Test Review

1. The annual change in the population of Egypt depends on the population the previous year, the number of people born each year, the number of people who die each year and the number of people who move to or leave Egypt each year. These statistics for Egypt are given below.

   - Births every year will equal about 2.3% of the total population.
   - Deaths every year will equal about 0.5% of the population.
   - Every year approximately 0.02 million more people will leave Egypt than will move to Egypt.
   - The 2005 population of Egypt was 77.5 million.

   Source: *CIA – The World Factbook 2005*

   a. Calculate estimates for the population of Egypt in 2006, 2007, 2008, and 2009.

Year	Population (in Millions)
2006	
2007	
2008	
2009	

   c. Use the words *NOW* and *NEXT* to write a rule that matches your description in Part b.

   Rule: _____

   d. When will the population first reach 90 million people?

3. For each rule below, produce a table of values showing how the quantity changes from the start through four stages of change.

   a. $NEXT = NOW - 0.25 \cdot NOW$, starting at 160

Stage	0	1	2	3	4
Value					

   b. $NEXT = NOW + 0.5 \cdot NOW + 5$, starting at 10

Stage	0	1	2	3	4
Value					

3. The height, in meters, of a punted football can be found using the rule $h = -4.9t^2 + 15t + 1$, where t is the number of seconds since the football was punted.

   a. Find the height of the ball after 1.75 seconds. Explain how you got your answer or show your work.

b. Find the maximum height of the football to the nearest tenth of a meter. Sketch the graph of the function. Be sure to label the vertical axis. Explain how the graph shows the maximum height.

Time (in seconds)
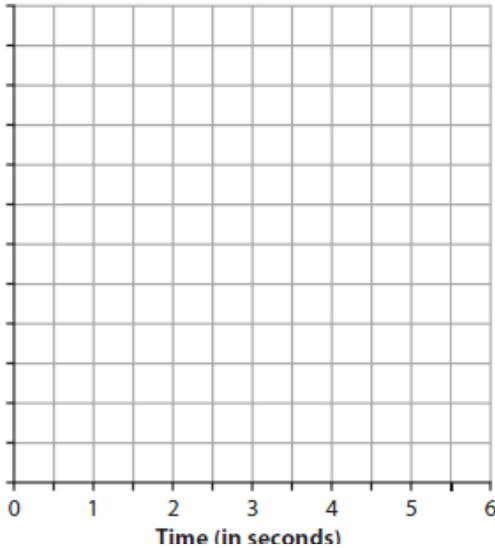
Maximum height: _____
Explanation:

c. Assume the football is not caught. Find the time (to the nearest tenth of a second) when the football hits the ground. Show or explain your work.

   Time when football hits the ground: _____
   Explanation:

1. Records at the Universal Video store show that sales of new DVDS are greatest in the first month after the release date. In the second month, sales are usually only about one-third of sales in the first month. Sales in the third month are usually only about one-third of sales in the second month, and so on.

   a. If Universal Video sells 180 copies of one particular DVD in the first month after its release, how many copies are likely to be sold in the second month? In the third month? Use the table below to help you answer the questions.

Number of Months	0	1	2	3	4	5
Number of DVD Sales	180					

   b. What NOW-NEXT and "y = " rules predict the sales in the following months?

   c. Use your equations to predict how many DVDs are in the 12th month?
   d. In what month are sales likely to first be fewer than 5 copies?

e. How would your answers to parts a – d change for a different DVD that has first month sales of 450 copies?

Number of Months	0	1	2	3	4	5
Number of DVD Sales	450	150	50	17	6	2

NOW-NEXT rule:

Y = _____

Number of DVDs in the 12th month:_____

First month in which fewer than 5 copies are sold:_____

2. Find the next three terms in each sequence. Identify each as arithmetic, geometric, or neither. For each arithmetic or geometric sequence, find the common difference or common ratio. Then write a NOW-NEXT rule to describe the sequence.
   a. 14, 11, 8, 5, 2 . . .   _____
   b. 3,000, 300, 30, 3 . . .   _____

3. Graph each function on graph paper and state the y-intercept.
   a. $Y = 2^x - 3$ b. $y = 3^{x+1}$ c. $y = (1/3)^x$

4. You may have heard of athletes being disqualified from competitions because they have used anabolic steroid drugs to increase their weight and strength. These drugs are dangerous and leave the body slowly. With an injection of the steroid cyprionate the level of the drug in your system **decreases by 10% each day**. Suppose that an athlete tries steroids and injects a dose of 100 mg of cyprionate.
   a. Make a table showing the amount of the drug remaining at various times.

Number of Days	0	1	2	3	4	5
Amount of Cyprionate	100					

   b. Make a plot of the data in part a on your graph paper and write a short description of the pattern shown.
   c. Write two rules that describe the amount of steroid in the blood.

   NOW-NEXT rule:_ _____

   Y = _____

   d. Use one of the rules in part c to estimate the amount of steroid left after 0.5 days and 8.5 days.

   e. How long will it take the steroid to be reduced to only 1% (1 mg) of its original level in the body?

5. For each of the following rules, decide whether the function represented is an example of: an increasing linear function, a decreasing linear function, an exponential growth function, an exponential decay function, or neither a linear or exponential function.

   a. $Y = 5(0.4^x)$

   b. NEXT $= 5 \bullet$ NOW

   c. $Y = 5 - 0.4x$

   d. NEXT $=$ NOW $- 5$

   e. $Y = 5/x$

   f. NEXT $= 0.4 \bullet$ NOW

6. In 2000, the number of people worldwide living with HIV/AIDS was estimated at more than 36 million. That number was growing at an annual rate of about 15%.

   a. Make a table showing the projected number of people around the world living with HIV/AIDS in each of the ten years after 2000, assuming the growth rate remains 15% per year.

Years after 2000	0	1	2	3	4	5	6	7	8	9	10
AIDS Cases (in millions)											

   b. Write two different kinds of rules that could be used to estimate the number of people living with HIV/AIDS at any time in the future.

   NEXT = _____

   Y = _____

   c. Use the rules from part b to estimate the number of people living with HIV/AIDS in 2015.

   d. What factors might make the estimate of part c an inaccurate forecast?