Algebra 1R   Name _____
Unit 3 Day 1 Homework

1. Biologists estimate that the number of deer in Rhode Island in 2003 was 1,028, and in 2008 it had grown to 1,488. Biologists would like to model the deer population, p, as a function of the years, t, *since* 2000.

(a) Represent the information we have been told as two coordinate points. Be careful to know what your values of *time* are for each year.

(b) Calculate $\dfrac{\Delta p}{\Delta t}$ from 2003 to 2008. Include proper units in your answer.

(c) Give a physical interpretation of the value you found in part (b).

(d) Determine a linear relationship between the deer population, p, and the years since 2000, t.

2. A water tank is being filled by pumps at a constant rate. The volume of water in the tank V, in gallons, is given by the equation:

$$V(t) = 65t + 280, \text{ where } t \text{ is the time, in minutes, the pump has been on}$$

(a) At what rate, in gallons per minute, is the water being pumped into the tank?

(b) How many gallons of water were in the tank when the pumps were turned on?

(c) What is the volume in the tank after two hours of the pumps running?

(d) The pumps will turn off when the volume in the tank hits 10,000 gallons. To the nearest minute, after how long does this happen?

3. Maria charges $15 for every 2 hours that she babysits. Answer the following questions based on this information.

(a) How much would Maria charge for working for 5 hours?

(b) Fill out the table below for the amount that Maria makes as she babysits and graph the relationship on the grid provided.

Hours Worked, h	2	4	6	8	10	12
Amount, a, in $	15					

Amount Charged, a (vertical axis: 20, 40, 60, 80)

Hours Worked, h (horizontal axis: 2, 4, 6, 8, 10, 12)
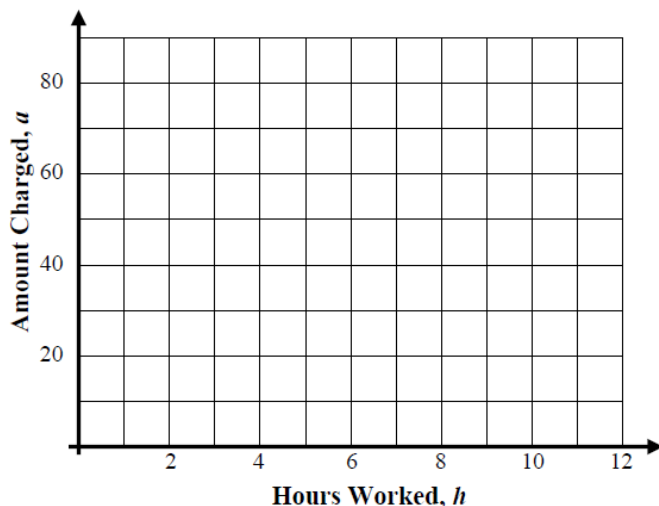
(c) Write an equation for the amount, a, that Maria makes as a function of the number of hours, h, that she babysits. Keep in mind that Maria will make $0 for babysitting for 0 hours.

4. The population of deer in a park is growing over the years. The table below gives the population found in a survey by local wildlife officials.

Year	2000	2003	2006	2009
Deer Population	168	216	264	312

(a) Find the average rate that the deer population is changing over each time interval below:

From 2000 to 2003   From 2003 to 2006   From 2006 to 2009

(b) Why does this calculation indicate a linear relationship?

(c) If t stands for the number of years since 2000, write an equation for the deer population, p, as a function of t.

(d) What does your model predict the deer population to be in the year 2014?

(e) How many years will it take for the deer population to reach 500? Round to the nearest year.