Pre-Calculus Name: Date: Period:

Assignment 1A: Regression

Answer the following problems from your Lippman/Rasmussen textbook with as much detail, explanation, and work that is appropriate.

1. A regression was run to determine if there is a relationship between the diameter of a tree (x, in inches) and the tree's age (y, in years). The results of the regression are given below. Use this to predict the age of a tree with diameter 10 inches.

   y=ax+b
   a=6.301
   b=-1.044
   r^2=0.940
   r=-0.970

2. The US census tracks the percentage of persons 25 years or older who are college graduates. That data for several years is given below.

Year	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008
Percent Graduates	21.3	21.4	22.2	23.6	24.4	25.6	26.7	27.7	28	29.4

   a) Find a linear regression model equation for the data.

   b) Find a quadratic regression model equation for the data.

   c) Determine if the trend appears linear or quadratic. *Explain.*

   d) Using the linear model, determine in what year will the percentage exceed 35%?

3. The US import of wine (in hectoliters) for several years is given below.

Year	1992	1994	1996	1998	2000	2002	2004	2006	2008	2009
Imports	2665	2688	3565	4129	4584	5655	6549	7950	8487	9462

   a. Determine if the trend appears linear. If so, what is the regression equation

   b. If so and the trend continues, in what year will imports exceed 12,000 hectoliters?

4. Find the quadratic regression model for this data and use it to find the maximum height.

Time (sec)	2	3	4	5	6	7	8
Height (m)	5	7.5	8.2	9	8.5	7.8	6.1

When a projectile is launched, it's height s at time t can be found using the function $s(t) = s_0 + v_0 t - \frac{1}{2} g t^2$ and use the gravitation constant $g = 32\ ft/sec$. Use this equation and graph to answer the next couple questions.

5. A ball is thrown such that $s_0 = 5$ feet off of the ground. The ball has an initial velocity of $v_0 = 50$ ft/sec at the moment it is thrown.
   a. Write the height function for the ball.

   b. Sketch the graph of the projectile function.
   Identify and label the coordinates of the maximum point.

   a. Describe what does the y-coordinate of the maximum represent?

   b. Use your calculator to approximate when the ball will hit the ground to the nearest tenth of a second.