4. [12 points] The Dow Jones Industrial Average (DJIA) is a stock market index which measures how the stocks of 30 large publicly-owned companies perform during a given period of time. On September 27, 2012 at 11:30am the DJIA was 13,420 and at 1:30pm, the DJIA was 13,520. Suppose $A = h(t)$ gives the value of the DJIA t hours after 9:00am on September 27, 2012 with $0 \leq t \leq 8$.

a. [4 points] Using the information given above approximate A using a linear function, $\ell(t)$. Write an expression for $\ell(t)$.

$\ell(t) =$ _____

b. [4 points] Your friend tells you that an exponential function would be more accurate in modeling A. If $g(t)$ is an exponential function which approximates A, what is the hourly growth rate of $g(t)$? What was the value of the DJIA at 2:30pm on September 27, 2012 according to this model?

growth rate = _____ value of DJIA at 2:30pm = _____

c. [4 points] In the end you realize the best model for A is a function of the form

$$p(t) = t^k + b$$

where k and b are constants. You also find out that at 9am on September 27, the DJIA was actually 13,402. Find values of k and b so that $p(t)$ approximates A.

$k =$ _____ $b =$ _____