Math3 Name_____Date_____

(33 pts) **MP2 Long Term Assignment #1** Per_____

1) The People's Republic of China is the country with the largest population in the world. The population in 2011 was approximately 1.3 billion. Although families are encouraged to have only one child, the population is still growing at a rate of about 0.5% per year.

a. Estimate the population of China for each of the next 5 years and record your estimates in a data table. [2 pts]

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Population (in billions)						

b. When is it likely that the population of China will reach 1.5 billion? [2 pts]

c. How would your prediction in Part **b** change if the growth rate were 1.0%, double the current rate? [3 pts]

d. Using the word ***NOW*** to stand for the population in any year, write rules that show how to calculate the population in the ***NEXT*** year:

i. if the growth rate stays at 0.5% [2 pts]

ii. if the growth rate doubles to 1.0% [2 pts]

2) Timber wolves were once very common in wild land across the northern United States. However, when the Endangered Species Act was passed in 1973, wolves were placed on the endangered list.

Thirty years later, the wolf populations have recovered in the northern Rockies and in the forests of Minnesota, Wisconsin, and Michigan. In 2011, estimates placed the Midwest wolf population at about 4,200.

a. Use the 2011 population estimate of 4,200 wolves and a **growth rate of 15%** to predict populations for the next five years. Record your results in a data table. [2 pts]

Year	2011	2012	2013	2014	2015	2016
Wolf Population						

b. Estimate the **time** when the Midwest wolf population will reach 30,000 (this is the number believed to have lived in the Great Lakes region 500 years ago). [2 pts]

c. How does your answer to Part **b** change if you use a higher growth rate estimate of 20%? [3 pts]

d. Using the word ***NOW*** to stand for the Midwest wolf population in any year, write rules that show how to calculate the population in the ***NEXT*** year:

i. if the growth rate is 15% [2 pts]

ii. if the growth rate is 20% [2 pts]

3) Midwestern farmers who raise daily cattle are concerned that growing wolf populations described in Task 2 on the previous page threaten the safety of their herds. They want permission to kill wolves that hunt livestock.

a. Make a table showing how the 2011 Midwest wolf population of about 4,200 would change over the next five years if the natural growth rate is 15% per year, but **an annual hunt of 250 animals** were allowed. [2 pts]

Year						
Wolf Population						

b. **When** is it likely that the Midwest wolf population would reach 30,000 if the annual hunt of 250 animals were permitted? [2 pts]

c. How would your answer to part **b** change if the annual hunt were increased to 500? [3 pts]

d. Using the word ***NOW*** to stand for the population in any year, write rules that show how to calculate the population in the ***NEXT*** year:

i. if the natural growth rate is 15% and 250 wolves are killed each year. [2 pts]

ii. if the growth rate is 15% but the annual hunt increases to 500 wolves per year. [2 pts]