Name:____

Modeling Populations with Linear Functions

Setup: Linear functions can be used to model a variety of things we see around us. A specific example is population growth, not just for animal. However, to make this more personal, what you'll do here is model the population growth of your hometown using a linear function, which we've discussed in class.

1) Your hometown is : ____

2) Using any resource you wish (Wikipedia is a fine source) find the information to fill in the table below for your hometown, where let's let $t = years\ after\ 1900$.

Years after 1900	Population (in thousands)
0	
10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

3) Using the pieces of information from the table above, make a scatterplot of the data, and label and mark each axis.

4) **By hand** sketch in a line of best fit and find the equation for your line of best fit. Show your work below.

Equation for line of best fit: ______________________________

5) Now, use your calculator to get a linear regression fit of the data from your table and report the line of best fit below. Hint: You'll first need to make the table in your calculator by going to STAT → EDIT and filling in L1 and L2.

Equation for line of best fit: ______________________________

6) Why don't the equations you found in question 4 and question 5 match exactly?

7) From your equation in part 5, explain what the slope and y-intercept actually mean in real-life, that is, in context.

Slope:

y-intercept:

8) Use your equations from question 5 to estimate the population in 2000 and also in 2010.

Model	**Population in 2000 (in thousands)**	**Population in 2010 (in thousands)**
Linear		

9) Now use Google (type in "Helena, Montana 2000 population" for example) to find what the actual populations were in 2000 and 2010. Which year, 2000 or 2010, did the models' predictions do better and why do you suppose this is so?