**Christmas Break EXTRA CREDIT:**

1.5 Points Each. (towards your test grade).

Bring in the assignment on the Monday after break with your work shown and your name on the page. Be neat!! You may do one of the problems for 1.5 points or both (for 3 extra points). As long as the work is correct of course.

**Problem 1:** **What percent of cars in Rhode Island have a headlight out?**

Recently one of my headlights went out, which I promptly got fixed. While my light was out, I started noticing the number of people who were driving with a headlight out at night. This prompted the question: What is the true proportion of cars in Rhode Island that have a headlight out?

**Your Task:**

When you (or preferably someone else for safety reasons) is driving at night over break. Count the number of cars that pass you on the other side of the road and determine the percent of them that have at least 1 headlight out. Calculate a 95% confidence interval for the number of cars with a headlight out in Providence. You must have a sample size of at least 200 cars (this might seem like a lot of cars, but on the highway this would probably only take a few minutes). You must report the raw data (i.e. 12 out of 200 cars had a headlight out).

*For example if 12 out of 200 cars have a headlight out, you could construct a 95% confidence interval around this fact. If this were the number of cars with a headlight out, then a 95% confidence interval would say that the true percent of cars with a headlight out was between 2.70% and 9.29%.*

**Problem 2: What is the current daily relative growth rate of the world population?**

***YOUR TASK:***

*Go to the following website which tracks the current world population. Mark the population at the time you go on the site.*

*i.e. when I visited the site on Thursday, December 19th at 2:19PM, the population was 7,131,735,895*

Enjoy Christmas Break, Relax, Do your thing. Go back to the site at some point at least 7 days later and mark the population of the world at that point in time (try to go back around the same time of day). Maybe 8 days later for example.

1. Use these two populations, to determine the relative growth rate of the population. Write a function for the population of the world at time t, where t is measured in days from whenever you initially measured the population.
2. Use your model to predict the world population at the end of the school year June 12th 2014. Show your work.