IM 2 Unit 4 Assignment: Modeling Population Data

In this project, you will research population data for an African or Asian country of your choosing and then find two equations to help you model the collected data. From your models, you will also be asked to make predictions.

Find the population data for your country between the years 1950 and 2010. If you need to you can go by increments of 5 years to speed things up a bit. Or you can do 60 data points to get a more accurate data recording.

You are required to:

(1) Select a country & let me know what country you are choosing. One person per country. Briefly explain WHY you selected the country and include a map, showing where the country is located.

(2) Find the population data between the years 1950 and 2010 (if possible). Finding annual data is preferable, but you may go by increments of 5 years at a time if you wish. Present your data as a table & cite your source.

(3) Graph your data, either by hand or electronically (EXCEL, graphing calculator, DESMOS, etc ..)

(4) Determine two models for your data set. Start by defining your variables and include this in your report. You must show the analysis that leads to your equations (show your work – how you developed your equation). Your two models will be:

(A) Linear ($y = mx + b$) (B) Exponential ($y = Ca^x$)

(5) Draw a second graph, wherein you show all the data points, and the two equations will be graphed as well.

(6) Comment on how well your equations do (or don't) fit your data set. Provide at least 2 reasons as to why the equation and the data set do/don't fit well.

(7) Now, you will use your two equations to make some predictions for the population of this country. So answer the following questions:

(A) Use both equations to predict the population of your country in 1900. Now research to find the actual population in 1900 (cite your source(s)). Which model was a closer predictor of the population in 1900? Offer a reason as to why.

(B) Use both equations to predict the population of your country in 2050. Why population value seems more reasonable for the future? Offer a reason as to why.

(C) Because your country is a developing, third world nation, the IMF has decided that in 2016, they will give a loan to your country an interest free loan of $100 per each person in your country. How much does your country expect to get? Show/explain how you got your answer.

(8) The World Health Organization has been actively promoting a decrease in the population growth rate, and would like to see your country's current population increase by only 10% of its current population in the next 25 years. Calculate the new annual growth rate that your country should have, working again with both linear and exponential models for the population growth. (HINT: What is your countries current population and what would it be in 25 years if the current population should only increase by 10%)

Here is an exemplar of an assignment:

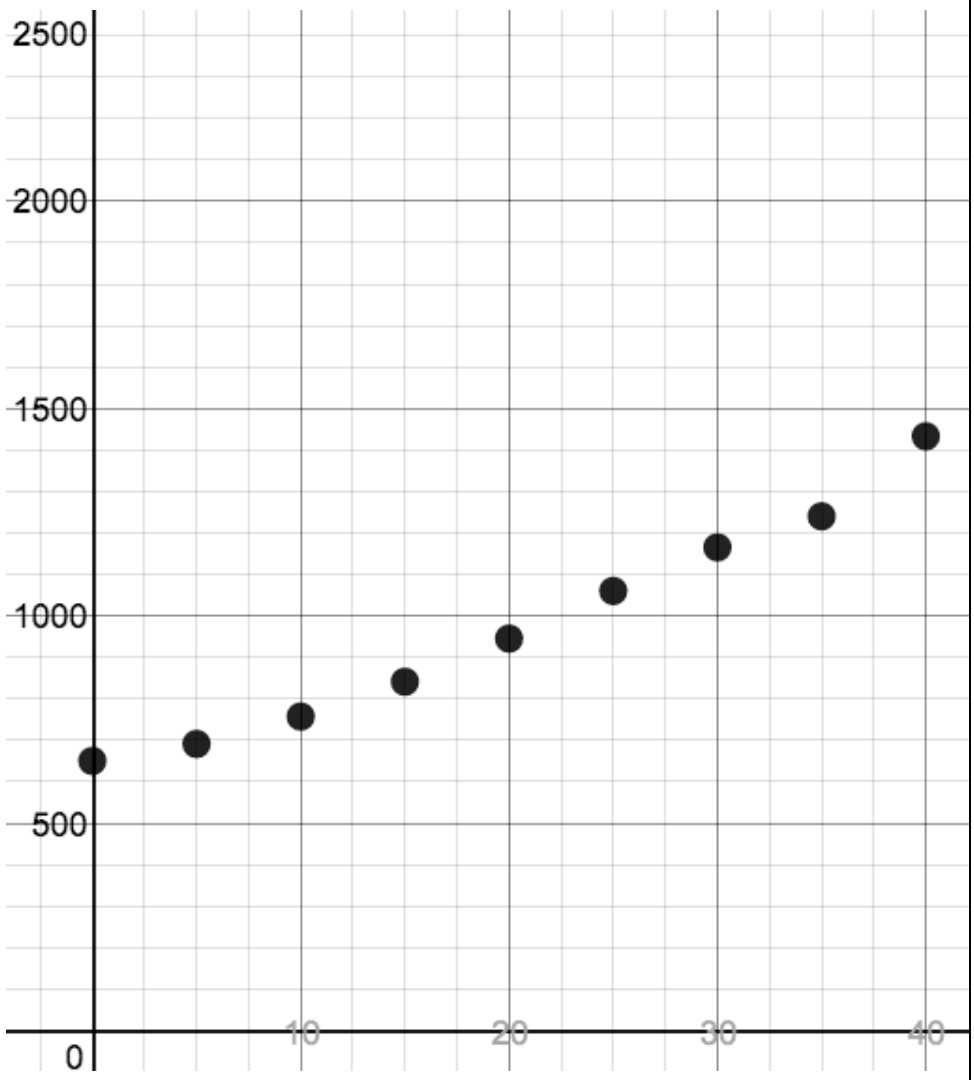
Introduction ….. Here is the country I am researching and here are a couple of reasons why ….

Map & Location:

Pop data:

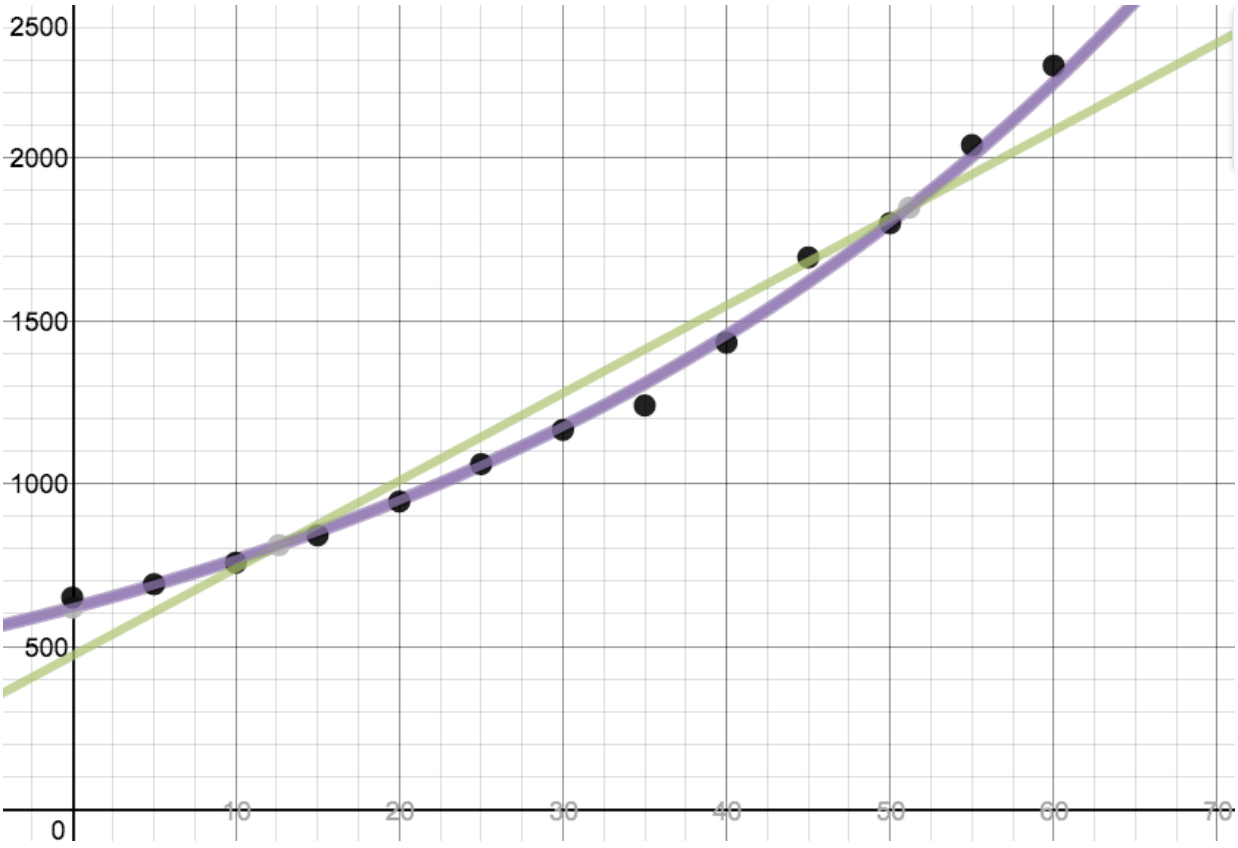
Year	Pop
1950	650,000
1955	691,000
1960	757,000
1965	841,000
1970	945,000
1975	1,060,000
1980	1,165,000
1985	1,240,000
1990	1,433,000
1995	1,695,000
2000	1,800,000
2005	2,040,000
2010	2,284,000

from
http://www.populstat.info/Asia/bhutanc.htm



Linear Equation/model	Exponential Equation/model
Here is my work ….	Here is my work …
Here is my equation … P = 26.9x + 471 where x is years since 1950 and P is the total population in thousands of people	Here is my equation … P = $691(1.0216)^x$ where x is years since 1950 and P is the total population in thousands of people

Here is the scatter-plot shown, with the 2 models/equations as well



Here are the answers to the remaining questions:

(6) …. How well do the equations fit to the data ???

(7) ….. here are the predictions (show the work that leads to your answers …..)

(8) …. Here is a forecast/prediction based upon the premise of a reduction in the population growth rate ….. (show the work that leads to your answers …..)