2015

Elementary Algebra

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Designing Information Assignments for Literacy

Professor's Name: Mangala Kothari
Course Name/Section: Elementary Algebra
Activity Duration: 30 minutes in-class, 1-2 hours outside class
Activity Learning Objectives:

- To familiarize students with process of research such as gathering information using databases, analyzing the data using math skills and making informed conclusions.
- To help students recognize the connection of math skill they learn in class to the world around them.
- To help students learn math in context.

Activity Description:

The assignment is about the world's population dynamics. Using a given a data about the world population from 1950, students will be able to find the observed trend, the rate of population growth and build a model (linear equation) using the data. They will also be able to predict the future world's population size based on the model that they develop. Students will use math skills learnt in their elementary algebra class to do the computations. They will be able to enhance their knowledge of using the technology tools such as Excel or graphing calculators to do the math.

In the second part of the assignment students will have an opportunity to do their own research and compare their results with the scientific information available online. Students can also talk about the practicality and scope of the model they have developed.

At the end of the assignment students will be able to reflect on their learning and connect its usefulness in the real world. The open ended questions will allow them to build their own line of inquiry for further study of related topics such income levels and population growth, birth rates, fertility rate or life expectancies over the time.

Vocabulary/Keyword(s): Rounding numbers, Graphing linear equations, Applications of linear modeling, Searching online databases

Materials and Resources: Students may use calculator or MS Excel application for calculations and graphing purpose.

Activity:

World Population Dynamics

The table gives the population of the world for every ten years from 1950:

Year	Population in Thousands
1950	2 525 149
1960	3 018 344
1970	3 682 488
1980	4 439 632
1990	5 309 668
2000	6 126 622
2010	6 929 725

Source: http://esa.un.org/unpd/wpp/DVD/

Part 1: Use the above chart to answer the following questions

1. Write the population for each year in the table in millions; round each number to tenth and make your own chart with new numbers.
2. Write each data value as an ordered pair (x, y) where x represents a year and y represents world population in millions for that year.
3. Graph each pair of points (x, y) on the same set of coordinate axes, choose x as independent variable and y as dependent variable. What trend do you observe from the graph?
4. Compute slope for every pair of points. Are the slopes same? Interpret one value of the slope.
5. Choose any two data points to find the equation of a line.
6. Use the equation you found in question#5 to predict the world population in 1975, 1985, 1995 2005, and 2015. Round your answers to millions.
7. Do you think we can use this linear equation to predict the future world population for the year 2090? Why or why not?
8. Search the Internet or your campus library to find the actual world population in 1975, 1985, 1995, 2005 and 2015. Compare the results with your answers in question#6. Are your predictions higher or lower than the actual population? Cite the source for the information you obtained.

Year	1975	1985	1995	2005	2015
Predicted population using linear equation (in Millions)					
Actual population (in Millions)					

Part 2: Research on your own

1. Search the Internet or your campus library to find the population of the USA in years 2010 and 2015, comment on how much the population size has increased over the five years.
2. Compute the rate of change in the population per year.
3. Develop and use the linear model as in Part1 to predict the population of the USA in 2015. Are your predictions higher or lower than the one you found on internet?
4. How do the trends for USA population compare with the world population over the years? Are they similar or different? Explain
   (Hint: compare the rate of change in population per year. Notice that rate of change in population per year is the slope of the trend line)
5. Write a paragraph about the dynamics of population for the world. What could be some of the possible parameters that contribute to the change in the population size? Reflect on what did you learn by doing this activity?

Extra Credit: (Part-1)

a) Use Excel or graphing calculator to plot the data points and graph the trend line on the same set of axes.
b) Find equation of the trend line using Excel.
c) Use the equation found in Excel to answer question#6.
