Linear Equations, Option 1: News Outlets

In 2000, 23% of Americans regularly used online news for getting news and this has increased at an average rate of approximately 1.3% per year since then. Find a linear function, in slope-intercept form, that models the given description. The function should model the percentage of Americans, $P(x)$, who regularly used online news $x$ years after 2000. Using your linear function, what do you expect the percentage of Americans who regularly used online news to be in 2008 ($x = 8$ years after 2000)? (Based on questions from section 2.4.)

Instructions:

1. **DUE:** Saturday, March 21st, 11:59 pm. Late submissions will be accepted for documented, extenuating circumstances. If there are no extenuating circumstances, late submissions can still be submitted with the Exam 1 e-portfolio revisions for possible extra credit, but will not count toward the 10% e-portfolio grade.

2. Please download the file MTH 163 Linear Equations News.pdf. (In this same folder.)

3. Please rename the file using the following format: LASTNAME Linear Equations News

4. Then please input your answers into the renamed file, using the "Description of Problem" and "Solution" fields that are provided. Please use 3 paragraphs to answer this question. In the three paragraphs, please address the following:

*Description of Problem* field:

**Paragraph 1** Please state the problem including the following:

1. Description of the situation.

2. Why is a linear function appropriate for modeling this situation? When answering this part, please include the following:

   (a) What does the average rate of 1.3% represent in the linear equation? Why, or how do we know this from the information that is given?

   (b) Is the slope negative or positive, and why?

   (c) Based on a quick overview of the given information, do you expect the percentage of Americans who regularly used online news in 2008 ($x = 8$ years after 2000) to be more or less than the number in 2000?
Solution field:

Paragraph 2  Please state your solution to the problem, including the following:

1. A quick overview of linear equations in slope-intercept form \( y = mx + b \), including:
   (a) What do \( m \) and \( b \) represent?
   (b) Describe the slope-intercept method for graphing the equation of a line.

2. Apply the method(s) for modeling situations with linear functions to this problem, including:
   (a) The linear function that you came up with to model this situation.
   (b) Please relate the linear function that you came up with to the given situation:
      i. For example, what does the \( y \)-intercept of \( b \) in your function represent in terms of the percentage of Americans who regularly used online news?
      ii. What does the slope \( m \) in your function represent in terms of the percentage of Americans who regularly used online news?

Paragraph 3  Please use the function that you came up with to answer the question, including the following:

1. What do you expect the percentage of Americans who regularly used online news was in 2008 (\( x = 8 \) years after 2000)? Is this what you had expected in part 2(c), above?

2. A quick description of the calculations that you made to obtain your answer.

3. Please graph your linear function, including the point with the \( x \)-value of \( x = 8 \).
   (a) Please upload a readable screenshot, scan, or jpeg/tiff/pdf file of your graph.
      i. The TCC library should have a scanner, as do most of the public libraries. You may also submit a readable screenshot of your graph.
      ii. Alternatively, Winplot is a free grapher for Windows users that can generate a jpeg/tiff/pdf file of your graph that you can upload to Blackboard.
      iii. You may also use a graphing utility of your choice to generate and upload an image file in jpeg, tiff, or pdf format.
Modeling Online News Readership with Linear Functions

Description of Problem:

The problem we are presented with this time is in 2000, 23% of Americans regularly used online news for getting news and this has increased at an average rate of 1.3% per year since. A linear function is appropriate for modeling this situation because we are basing the statistics on an average constant rate of growth, not the actual year by year change. The average rate of 1.3% represents the growth and will be used as the slope in the linear equation. We know this because it is stated as the rate, or change. The slope will be positive as this will represent an increase or growth. Based on the information given, I expect the percentage of Americans who used online news in 2008 to be more than in 2000.
Solution:

A quick overview of linear equations in slope-intercept form, \( y = mx + b \).
m=the slope of a line or change in this situation
b=the y intercept or starting point in this situation
The slope intercept method of graphing a line is to start with the y intercept, or \( b \), the coordinate of the first point will be \((0, b)\). From the starting point, \( m \), the slope, tells how to plot the next point, a positive number you go up so many units before going right. A negative number number you go down by so many units before going right.
The linear function I came up with for this situation
\[ P(x) = 1.3x + 23 \]
The y intercept, \( b = 23 \) and represents the starting point of 23% of Americans in 2000
The slope, \( m = 1.3 \) and represents the growth of 1.3% each year.

I expect the percentage of Americans who regularly use online news in 2008, 8 years from 2000 to be 33.4% This is what I expected.

Calculations:
\[ P(x) = 1.3(8) + 23 \]
\[ P(x) = 10.4 + 23 \]
\[ P(x) = 33.4 \]

Student Questions / Instructor Comments:

GRADE: 100%
Great work! Thank you for a fantastic write-up and presentation. Also, your Winplot graphs are turning out nicely for these e-portfolio assignments!