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MTH 141

Greening Your Curriculum – 101

This assignment is to be used in MTH 141- College Algebra. The first week of this course focuses on linear functions. Students are typically very good at working with functions that they have been provided, but they struggle to create their own functions to represent data sets. For this assignment students will be asked to track for one week their daily use of one of the following: plastic water bottles, disposable coffee cups, or disposable food containers. Students will then use this data to represent an average week and use it to create a linear function that describes how many water bottles (or coffee cups or food containers) they have used as a function of weeks. As a class we will discuss how much this amounts to over an entire year (52 weeks), and how much waste our class alone will be contributing over the next year if we do not change our habits. The Story of Bottled Water will be shown in class as part of the in-class discussion. Students will be asked to brainstorm different ideas for ways they can become more sustainable.

Learning Outcomes for Class Covered by this Assignment

1. Correctly interpret and manipulate the following "basic" functions by graphical and algebraic means: constant, linear, square, cubic, reciprocal, square root, cube root, absolute value, greatest integer, logarithm with base a>1, natural logarithm, exponential with base a>1.
2. Find the domain, symmetries, zeros, intercepts, vertex, and asymptotes for functions of the following categories: quadratic, elementary higher degree polynomial, rational, radical, exponential, and logarithmic functions.
3. Sketch the graph of functions in these same categories.
4. Solve application problems, which are modeled by functions in these same categories.

Learning Outcomes Covered by this Assignment

1. Correctly interpret and manipulate by graphical and algebraic means: linear functions
2. Find the realistic domain of a linear function.
3. Sketch the graph of a linear function.
4. Solve application problems, which are modeled by linear functions.

Name:

How Much Waste do YOU Create in a Year?

1 Background

It seems that everywhere we go there is some reminder about "Going Green." Blue recycling bins are in every classroom, there are ads on the train reminding you to recycle, and there are even radio announcements reminding us to do our part to save the planet. We hear about this over and over but we rarely see any negative impacts as a result of our failure to recycle. This may make you think, " Is it really THAT important?" This is the question we will try to answer with this experiment. How much waste do you as an individual *actually* produce? Is it enough that recycling or choosing sustainable options could make a difference to the planet?

2 Data Gathering

Choose one of the following products and record your daily use of that product for **one week**.

1. Disposable water bottles
2. Disposable coffee cups
3. Disposable food containers
4. Other (subject to *prior* approval by your instructor)

3 Analysis

1. How many total items did you use in one week? Do you think this is a lot?

2. Using this as a representation of how many such items you are likely to use on a weekly basis, write a function $A(t)$ that describes how many total items you have used where t represents the number of weeks from today. We will consider this past week as "Week Zero", meaning that if your input is $t = 0$ then your output should be your answer from part (1).

   $A(t) =$

3. What is a reasonable domain for this function?

   D :

4. What is a reasonable range for this function?

   R :

5. Using a neatly scaled and labeled axis, graph your function $A(t)$ over the domain $[0, 52]$.

6. How many water bottles/coffee cups/food containers/other are you expected to use by the end of this semester?

7. How many water bottles/coffee cups/food containers/other are you expected to use in one year?

8. Were your answers what you were expecting or were they higher/lower than you expected?

9. Oftentimes we do not consider the magnitude of our own waste because it is not stored in our homes. We use something, we throw it into the trash bin when we are done, and then the trash is collected and most of us never see it or think about it again. Imagine if all of those products you used in part (7) were stored in your house. Would you be happy with that? Why or why not?

10. What are some ways that you can decrease the amount of disposable products that you use?