

Mth126 Problem Solving Activities

Overview. These are non-routine problems. You will need to look up some key pieces of information on the internet. Google (www.google.com) and Wolfram Alpha (www.wolframalpha.com) are two good places to look. The first exercise is just to get you familiar with some of Wolfram Alpha. After that, you are on your own!

Use whatever resources you like, but be sure you interpret your answers thoughtfully and *be prepared to present your answers and defend your reasoning* in class on Monday, 1/31. Note that there may be more than one ‘reasonable’ answer to some questions.

- Wolfram Alpha (and Google) Warm-up:** Go to www.wolframalpha.com and try to get it to answer the following questions. (You may have to play with the wording a bit to get the right answer – be persistent. Summarize the results.
 - Type in your birthday (day, month, and year).
 - Let n = your current age, rounded to the nearest year. Calculate $n!$ (i.e., the factorial of your current age).
 - How many planets are there in the Milky Way galaxy?
 - How many calories are there in a Milky Way candy bar?
 - How thick is a dollar bill? (if Wolfram Alpha doesn't know, ask Google!)
 - What is the current national debt of the United States? (compare with <http://www.usdebtclock.org/>)
 - What is the current distance from the Earth to the moon?
 - How many inches are in a mile?
 - What is the size of the Earth?
 - Just for kicks, try a few other questions (type in your birthdate, your hometown, or even “poker hands”). Want to amaze your smarty-pants friends who took calculus? Ask them to integrate $f(x) = x/(x+1)$. Then have Wolfram Alpha do it in a flash (“integrate $x/(x+1)$ ”).
 - You know, with tools like this at our disposal, we might have to start rethinking what we teach our kids....
- National Debt in dollar bills:** If crisp \$1 bills were stacked up, one on top of the other, how high would the stack be if its value were equal to the current US National Debt? Report your answer in a meaningful context – is it as tall as a sky scraper? Does it reach into outer space? All the way to Mars? (Bonus question: how high did the stack grow in the time it took you to answer this problem?)
- National Debt in seconds:** What was happening on Earth 1 million seconds ago? How about 1 billion seconds ago? 1 trillion seconds ago? 14 trillion seconds ago?
- National Debt in feet:** How far do you travel when you walk 1 million inches? 1 billion inches? (have you walked around the Earth yet?) If you had a space ship, where might you be if you traveled 14 trillion inches?
- And finally, a bit of counting:** How many different license plates are possible if they have three digits (0-9) followed by three letters? Wolfram Alpha says there are about 2.085 million households in Wisconsin. Are we in danger of running out of license plate codes in Wisconsin?