2-3 Calculator Worksheet

Section 2-3 talks about using our gc to solve equations and inequalities, skills we have already seen. You can look through the section if you want a refresher. This worksheet will give you some word problems. Solve them using your calculator, do not try to solve them by hand. Putting the formula in the $Y=$, adjusting the WINDOW, using ZOOM, VALUE, ZERO and INTERCEPT will all be common activities. Remember, there are two ways to solve A=B. One is to graph $y_1 = A$ and $y_2 = B$ and then find where they cross using INTERCEPT. You will need to adjust your window to be able to see the point(s) of intersection. A second way is to graph $y_1 = A - B$ and find where it hits 0 (the *x* intercepts) using ZERO.

Class example: p. 173 # 58. Do problems in book. Add describe in words what the graph shows. Find the profit for 300 units sold.

Please write the answers on a piece of paper. Also include a quick sketch of the graph you used. This homework will be checked and on the hw quiz like any other hw assignment. Be careful about how you put in the formulas, particularly the use of parenthesis. Give appropriate answers (use 2 decimal places when context is not clear), including units.

1. Use the equation and context from p. 173 # 59 to do the following: (use zoom fit)
    a) How far can you see if you are 30 feet above sea level? 95 feet?
    b) What is your height if you can see 2 miles? 10.5 miles?

2. The number of people in prison in the United States has changed over time. It can be modeled by the formula $P = .028t^3 - 1.09t^2 + 13.03t + 146.88$ where P is the number of prisoners (measured in 1000's) and *t* is the number of years since 1950.
    a) Describe how the number of prisoners has changed from 1950 to 2007
    b) How many prisoners were there in 1950? 1970? 1990?
    c) In what year was there 2 million prisoners? (How many thousands is this?)

3. Drivers of different ages get into accidents with different levels of frequency. The formula $A = 2x^2 - 150x + 4000$ gives the total number of accidents per month that all American drivers of age *x* get into to. Use this formula to investigate drivers up to age 80.
    a) What are the total number of accidents for 16 year olds in a month? What about 37 year old drivers?
    b) What are the age(s) that have 1600 accidents a month
    c) What are the ages that have more than 2500 accidents a month?
    d) Do you think the graph is realistic? Explain why or why not?

4. On the island of Creton, rabbits lived a good life until a wolf population was introduced to the island in 1975. The wolf population increased as the rabbit population decreased. The number of rabbits can be modeled by $R = 400 - 8e^{.4t}$ and the number of wolves by $W = 50 + 4e^{.3t}$, with t the number of years since wolves were brought to the island. (e is a funky number that is important in math, like π. It is on the bottom left of you gc. We will study it more in later chapters)

   a) How many of each type of animal was present in 1975?
   b) How many rabbits and wolves were there in 1980?
   c) After how long were there the same number of wolves and rabbits?
   d) In what year does the rabbit population become extinct? How many wolves are at this time?

5. The average daily temperature in Fairbanks Alaska can be given by the formula $T = 37\sin\left(\frac{2\pi}{365}(x-101)\right) + 25$ where t is the day (from 0 to 365) and the temperature is measured in degrees Fahrenheit. (be careful how you put in the formula, make sure your gc is set to radian mode on the mode menu, we will study sine (sin) more in later chapters)

   a) What is the maximum average temperature? On what day does it occur?
   b) When is the average daily temperature below 0?
   c) What is the average temperature on the 27^{th} day? On the 230^{th} day?
   d) When is the average temperature above $60°$?

Answers to 2-3 Graphing Calculator Worksheet

1. a) 6.71 mi, 11.94 mi
   b) 2.66 feet, 73.50 feet

2. a) population increased slowly until about 1980 when it started to increase much faster
   b) 146,880 prisoners, 195,480 prisoners, 716,080 prisoners
   c) In 2003

3. a) 2112 accidents, 1188 accidents
   b) 23.14 years old or 51.86 years old
   c) older than 63.11 years old
   d)

4. a) 392 rabbits and 54 wolves
   b) 340 rabbits and 67 wolves
   c) After 8.98 years
   d) In 1984, there were 125 rabbits

5. a) $62°$ on the 192^{nd} day
   b) from the 0^{th} to the 57^{th} days and from the 326^{th} to the 365^{th} days
   c) $-10.38°$ and $54.46°$
   d) from the 173^{rd} to the 211^{th} days