Math-19 Section 1

# Homework #3

**Due: 6/24/2019 9:00am**

## Reading

Sections 1.8–1.12

## Problems

1. The amount of heat energy ($Q$) needed to change the temperature of an object (without going through a phase change like melting or boiling) is jointly proportional to the mass of the object ($m$) and the *change* in temperature ($\Delta T$).

   (a) Write an equation that models this physical phenomenon. Use $c$ for the constant of proportionality.

   (b) The MKS unit for heat energy is the Joule (J). The constant of proportionality is specific to the substance being heated and is referred to as the *specific heat* of the substance. If $Q$ is measured in Joules ($J$), $m$ is measured in grams ($g$), and temperature is measured in Kelvin (K), what are the units of $c$?

   (c) In the lab, it is found that $41790J$ of heat energy raises the temperature of $1L$ of water by $10K$. What is the specific heat of water? (1L of water=1000g)

2. Consider the equation:

   $$y = x^2 + 2x - 5$$

   For each of the parts below, use the graphing functions from your TI-84 *calc* menu to find the answers and submit a screen-shot from your calculator that shows the correct answer.

   (a) Find the $y$-value when $x = 1.3$ using the *value* function.

   (b) Find the $x$-intercepts using the *zero* function.

   (c) Determine the minimum value using the *minimum* function.

   (d) Determine the $x$-values for $y = 5$ using the *intersect* function. Note that you will need to add something to your graph to do this. Also note that there are multiple answers.

   (e) Now graph the function $y = x^2 + 11$. Huh!? Nothing seems to appear! Why, and how can you fix this? Submit a screen shot that uses your fix.