Tutorial Worksheet, 01/12/2016

Instructions: Please work in groups of 3 or 4 students and solve each of the problems below. Your LA can help you. You do not turn these in at the end of class, but your LA will take attendance so that you get credit for participating. You can spend up to 30 minutes on this worksheet. Afterwards, your LA will give you another activity to complete. In a typical week, there will be a quiz after the worksheet.

Graphing and Plotting

1. Graph each of the following equations by plotting, by hand, at least five points for each graph. Choose a scale which allow you to compute the exact values and show the overall shape of the graph. Both axes should be labeled.

    (a) $Y = 4 - \frac{3}{2}X$

    (b) $Q = P^2$.

(c) $x^2 + y^2 = 4$.

(d) $P = 2^t$

(e) $A = (1/2)^t$

2. Plot the data in the table below.

Table 1: Average daily high temperature in Detroit

Month (1 = Jan.)	1	2	3	4	5	6	7	8	9	10	11	12
High (°F)	31	34	45	58	70	79	83	81	74	61	48	46

3. If the data in Table 1 were to be modeled by a periodic function, we might try to find values of A, B, C, and D so that the graph of the equation below fits the data.

$$y = A \cos\left(B(x - C)\right) + D.$$

(a) As a warm-up exercise for the proposed goal above, graph each of the following functions by using your understanding of how transformations affect the position and shape of a graph. You may use a calculator to determine the answers, but the goal is to understand the effect of these transformations. Give exact values as much as a possible, e.g. $\cos(0) = 1$ and $\cos(\pi/2) = 0$.

    i. Graph $y = \cos x$.

ii. Graph $y = 2\cos x$. Hint: For this graph and each of the subsequent graphs, use your understanding of transformations to quickly sketch the graph by using your graph of $y = \cos x$.

iii. Graph $y = \cos(2x)$.

iv. Graph $y = \cos\left(x - \frac{\pi}{2}\right)$.

v. Graph $y = \cos x + 2$. Note: This is different from $y = \cos(x + 2)$.

(b) Discuss how you might determine values of A, B, C, and D which seem to fit the data in Table 1. Write your ideas down in a notebook so that you can refer to them later. We will discuss the solution to this problem in the next lecture. If you group runs out of time during the recitation, please spend some time working on this problem on your own before Wednesday's class.