

Mathematics 136 – Advanced Placement Calculus

Discussion 1

September 4, 2009

A) The graph  $y = f(x) = 4 - x^2$  for  $x$  in the interval  $[-1, 2]$  is given in Figure 1 on the back, together with several transformed graphs. Label the graphs with the letters  $A, B, C, D, E$  in some way. Then match each equation with its graph by letter and give reasons for your choices. (Note that one of the graphs is  $y = f(x)$  and you will need to identify that one as well.)

1.  $y = f(2x) - 4$

2.  $y = 2f(x + 6)$

3.  $y = -f(x + 4)$

4.  $y = \frac{1}{2}f(x) - 1$

B) Say  $y = f(x) = \cos(x)$  gives the usual graph of the cosine function for  $x$  in the domain  $[0, 4\pi]$ . For each of the following, write equations for the graph that is described and sketch.

1. The graph  $y = f(x)$  shifted three units down.

2. The graph  $y = f(x)$  reflected across the  $x$  axis, then shifted 2 units up.

3. The graph  $y = f(x)$  shifted  $\frac{\pi}{2}$  units to the left.

4. The graph  $y = f(x)$  stretched vertically by a factor of 4, then shifted up one unit.

5. The graph  $y = f(x)$  compressed, or shrunk horizontally by a factor of 2.

C) Imagine that each of the scatter plots 1, 2, 3 in Figure 2 were obtained as data from some experiment.

a. Decide what type of function you might choose as a model for the data. That is, what type of formula would yield a graph with something like this shape? Explain your choice.

b. From the information given in the plot, determine a possible formula of a function of the type you decided on for part 1. that would fit the data reasonably well.

c. Plot your function.

*Assignment*

Group writeups due in class on Monday, September 7.

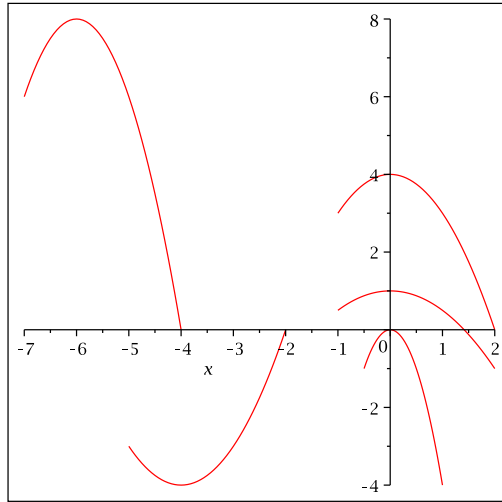
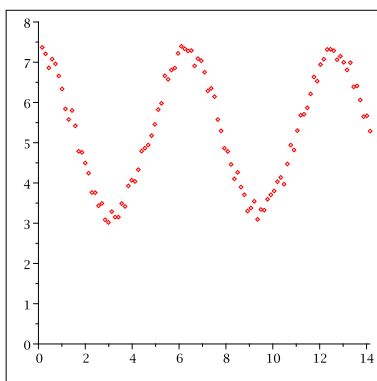
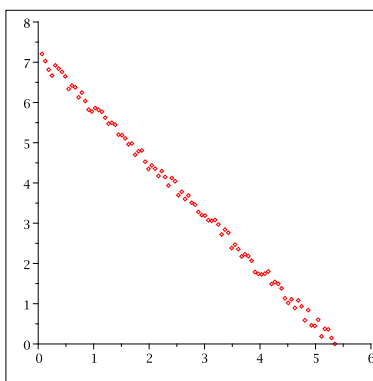


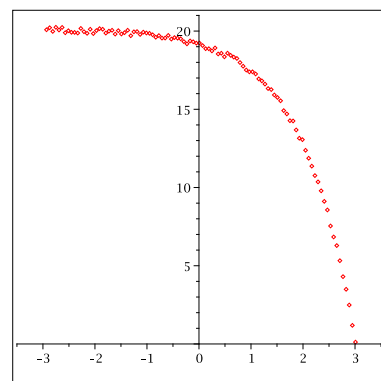
Figure 1: Plots for question A



(a) Plot 1



(b) Plot 2



(c) Plot 3

Figure 2: Scatter plots for question C