

Mathematics 136, Section 3 – AP Calculus, Section 4
Discussion 1–Matching Formulas to Graphs
September 10, 2003

Goals

Last week we began a review of the basic functions studied in calculus. Today, in a group discussion exercise, we will continue this by Given a graph, we will try to determine a reasonable formula that might yield a graph with that shape.

An additional goal will be to introduce you to a way of working in a classroom context you may not have experienced too often before in mathematics classes – *collaborative learning*. Some suggestions:

- Try to tackle the questions below *as a group*, not individually. For instance, talk through the questions together to be sure you understand what they mean, don't be shy about throwing out partial ideas or suggestions how to proceed. That's *the point* of doing things this way, and you're "in this" together.
- The goal is for *everyone* to contribute to, and fully understand the group's results. So if you think you "see" something, your job is to *explain* it to the other members of the group. On the other hand, if you don't understand something someone else says, your job is to *ask questions* until either you are convinced, or you are able to show the other person that he or she was mistaken.

Choose one or more "scribe(s)" within your group to keep a clean written record of what you do. The end product of the exercise will be one set of solutions to the problems below, which you will turn in as a group. I will assign one grade for each group's solutions.

Important Directions: No calculators, graphing or otherwise, may be used during the class discussion(!)

Find possible formulas for the functions defined by the graphs in problems 6-17 in the Review Problems for Chapter 1 on page 49 of our text.

Some suggestions

- Start by trying to determine what *family* of functions fits the properties of the graph the best (i.e. is it the graph of a *linear* function, an *exponential* function, a *polynomial* function, a *trigonometric function*, a *rational* function?)
- Once you have decided what type of function you are dealing with, you'll need to think about determining the slope and intercept, the constants y_0 and a in an exponential function $f(x) = y_0a^x$, and so forth. You may also need to shift and/or scale the basic functions we have studied to get a graph like the one shown.
- NOTE: There are many different correct answers these, but some of them are very complicated. Try to find a "simple" formula that will work!

Due: In class, Wednesday, September 10.