

## Chapter 1

- 1.1** Find the total change and the average rate of change for a given function. In particular, be able to find the average velocity. Know the  $\Delta$  notation.
- 1.2** Know what a function is, which is the independent variable and which is the dependent variable, and know what the proper units are for the average rate of change. From this section, the exam only covers page 9 – middle of page 13.
- 1.3** Know what a linear function is, and be able to work with them from tables, graphs, formulas, or descriptions. For a general function, be able to say where it is increasing and where it is decreasing. Know the graphical interpretation of average rate of change.
- 1.4** Know the meaning of the cost function, fixed costs, variable costs, the revenue function, profit, and the break-even point. From this section, the exam only covers pages 35 – 39.
- 1.5** Know what an exponential function is, and be able to work with them from tables, graphs, formulas, or descriptions. For exponential functions, know the meaning of exponential growth, exponential decay, doubling time, and half-life. From this section, you can skip the discussion of the relative rate of change in the middle of page 55.

## Chapter 2

- 2.1** Given some function  $P = f(t)$ , you should be able to do the following:
1. Compute total change in  $P$  between  $t = a$  and  $t = b$ ;
  2. Compute the average rate of change of  $P$  between  $t = a$  and  $t = b$ ;
  3. Compute the (instantaneous) rate of change of  $P$  at some point  $t = a$ .
  4. From a graph, determine where the slope is positive, negative, or zero. Also determine where you have the greatest and least slopes.
- Be sure to include correct units for (1)—(3) above.
- 2.2** Given a function  $y = f(x)$ ,  $f'(a)$  denotes the derivative of  $f$  at the point  $x = a$ . All three of the following mean the exact same thing.
- the derivative of  $f$  at  $a$
  - the rate of change of  $f$  at  $a$
  - the slope of the graph of  $f$  at  $a$

Since we've already dealt with slope and rate of change in 2.1, most of the problems in 2.2 are very similar. They simply use the new notation  $f'(a)$ . This section also talks about the graphical interpretation of total change, average rate of change, and rate of change at a point. You may be given the graph of  $f(x)$  along with two points  $x = a$  and  $x = b$ . You should understand the graphical meaning of  $f(b)$ ,  $f(a)$ ,  $b - a$ ,  $f(b) - f(a)$ ,  $\frac{f(b) - f(a)}{b - a}$ , and  $f'(a)$ .

- 2.3** Given a function  $y = f(x)$ , we learned how to compute  $f'(a)$  at any point  $x = a$ . So we see that  $f'(x)$  is itself a function. Given a graph of  $f(x)$ , you should be able to sketch a graph of  $f'(x)$ . Remember that in the graph of  $f'(x)$ , the  $y$ -values are just recording what the slopes are in the graph of  $f(x)$ . Another problem may give you information about  $f'(x)$  and ask you to sketch a graph of  $f(x)$ . Knowing where  $f'$  is positive, negative, or zero tells you where  $f$  is increasing, decreasing, or constant - this enables you to sketch a graph of  $f(x)$ .

## Calculator

Remember to bring your graphing calculator on Thursday. You should be able to enter functions, determine appropriate windows, and then graph those functions. You should also be able to find the coordinates for horizontal and vertical intercepts, points of intersection, and roots (also called zeroes.) You will be asked to find these accurate to a certain number of decimal places. You can do this by using ZOOM and TRACE or the built-in features of your calculator. You should also be able to approximate the slope (or derivative) at any point on the graph.