

**This assignment is due by 11 am on February 23, 2007** You can turn it in to me in class or drop it by the office, **Blocker 640D**. Be sure that you follow the homework rules, they can be found on your syllabus. Please work the problems in the order that they are listed.

**Give all answers to at least 4 decimal digits. Be careful to not round intermediate steps since this can cause problems with your final answer.**

1. Use the table to estimate the following. Note: Do not use regression to get a formula for the data.

|      |    |    |    |    |    |
|------|----|----|----|----|----|
| x    | 1  | 2  | 3  | 5  | 8  |
| f(x) | 10 | 12 | 14 | 20 | 39 |

(a)  $f'(2)$

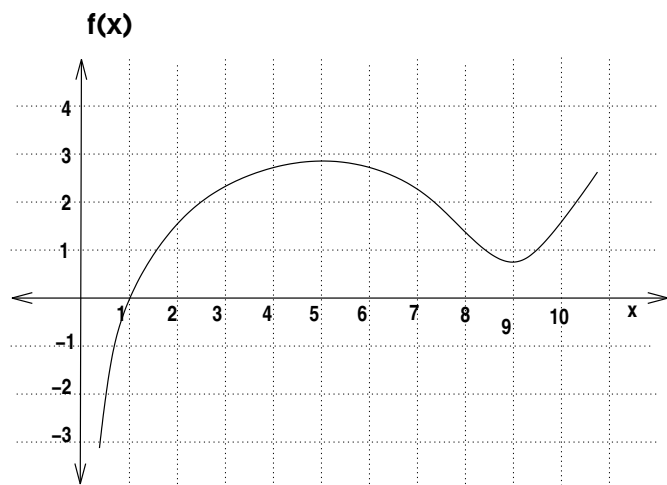
(b)  $f'(5)$

2. The graph is of the function  $f(x)$ .

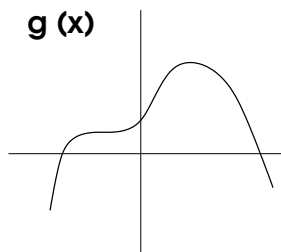
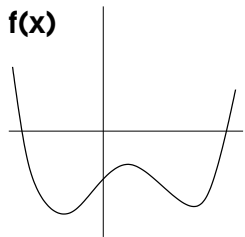
(a) Estimate  $f'(1)$

(b) Estimate  $f'(3)$

(c) At what values of  $x$  is  $f'(x) = 0$ ?



3. For each of these graphs, sketch the graph of derivative function.



4. Draw a possible graph of a **function** that meets this information for set of conditions. Note: you will have only one graph for part (a) and one graph for part (b).

(a)  $f'(x) < 0$  for  $x < 2$   
 $f'(x) > 0$  for  $x > 4$   
 $f'(x) = 0$  for  $2 < x < 4$

(b)  $f(x)$  is always positive.

$f'(x) > 0$  on  $-1 < x < 3$   
 $f'(x) < 0$  for  $x < -1$  and for  $x > 3$   
 $f'(x) = 0$  for  $x = -1$  and  $x = 3$

5. A student is studying a population of bacteria. The function  $P(t)$  gives the population, in critters, as a function of time,  $t$ , in hours.

(a) Interpret the statements  $P(5) = 6500$  and  $P'(5) = -840$  in terms of the population of bacteria.

(b) Use the information in part (a) to estimate  $P(6)$ .

6. For some painkillers, the size of the dose,  $D$ , given depends on the weight of the patient,  $W$ . Thus,  $D = f(w)$ , where  $D$  is in milligrams and  $W$  is in pounds.

(a) Interpret the statements  $f(165) = 153$  and  $f'(165) = 5$  in terms of this painkiller.

(b) Use the information in part (a) to estimate  $f(173)$ .