

1. (2 points each) **True or False.** Circle True only if the statement is always true.

(a) If  $f'$  is increasing, then  $f$  is increasing. T F

(b) If  $f$  is an exponential function, then  $\frac{d}{dx} \ln f(x)$  is constant. T F

(c) If  $f''(x) = 0$  for all  $x$ , then  $f$  is a constant function. T F

(d) There is a function  $f$  so that  $f(x) > 0$ ,  $f'(x) < 0$ ,  
and  $f''(x) < 0$  for all  $x$ . T F

(e) If  $f''(x) < 0$  for all  $x$ , then  $f(x) \leq f(0) + f'(0)x$  T F

(f) If  $f'(x) = 0$ , then  $f$  has either a relative  
maximum or relative minimum at  $x$ . T F

2. (7 points) The function  $g$  has a continuous derivative whose values are given in the following table. There is no more than one critical point of  $g$  between any two consecutive  $x$ -values in the table.

Note that the table gives values of  $g'(x)$ , **NOT**  $g(x)$ .

$x$	0	1	2	3	4	5	6	7	8	9	10
$g'(x)$	-9	-2	2	1	-1	-3	-6	-5	-4	2	10

(a) Estimate the  $x$ -coordinates of the critical points of  $g$  for  $0 < x < 10$ .

(b) For each critical point found in part (a), determine if it corresponds to a local maximum or minimum of the function  $g$ . Be sure to explain.