

(1.) (16 points) Indicate whether each statement is true or false. Circle TRUE only if the statement is *always* true.

(a) If  $x = 4$  is a critical point of the function  $f$ , then  $f'(4) = 0$ .

TRUE

 FALSE

(b) If  $g'(x) < 0$  for  $x < 3$ ,  $g'(x) > 0$  for  $x > 3$ , and  $g'(3) = 0$ , then  $g$  has a local minimum at  $x = 3$ .

 TRUE

FALSE

(c) If  $f'(x)$  is defined for all  $x$ , then  $f(x)$  is defined for all  $x$ .

 TRUE

FALSE

(d) It is possible to have a local minimum of  $f$  at  $x = c$  if  $f''(c) = 0$ .

 TRUE

FALSE

(e) If  $f'(3) = 6.4$  and  $g'(3) = 2.3$ , then the graph of  $f(x) - g(x)$  has a slope of 4.1 at  $x = 3$ .

 TRUE

FALSE

(f) If  $f(x)$  is increasing for all  $x$ , then  $f'(x)$  is increasing.

TRUE

 FALSE

(g) For a revenue function,  $R$ , and a cost function,  $C$ , if  $R(q_0) > C(q_0)$  and  $MR < MC$  at  $q = q_0$ , a company would be advised to increase  $q$ .

TRUE

 FALSE

(h) The profit function is always maximized if marginal revenue equals marginal cost.

TRUE

 FALSE