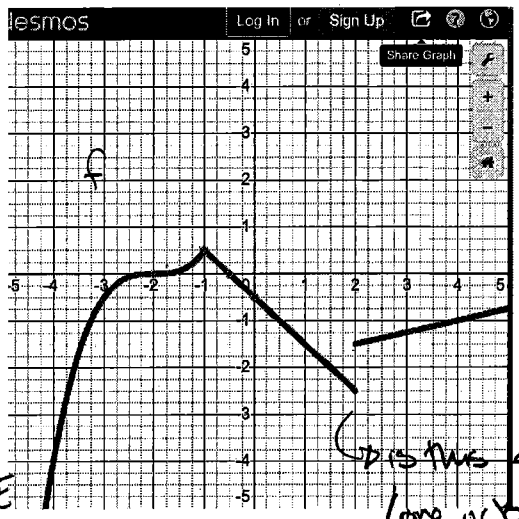
Quiz 8

Key

This is a two-stage quiz. During the first stage, use your knowledge & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyone's name on it!!!) to be turned in for the group.

Show *all* your work. Reasonable supporting work must be shown for any partial credit.



1. Use the graph for the questions below.

   Assuming domain $[-5, 5]$

   (a) [1] Estimate a local maximum

   $(-1, .5)$, $(5, -.75)$ both work

   x-coord or y-coord will work

   (b) [2] Estimate at least three critical points

   (+.5) $(-2, 0)$ (+.5) $(-1, .5)$ (+.5) $(2, *)$

   $f'(-2) = 0$ $f'(-1)$ DNE $f'(2)$ DNE

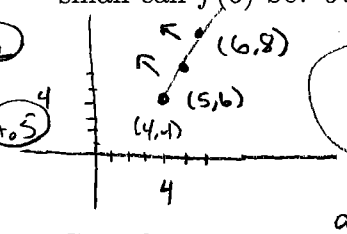
   Is this a function? (one or both ends need open circles)

2. [2] Given that f is differentiable, that $f(4) = 4$, and that $f'(x) > 2$ for $4 \le x \le 6$, how small can $f(6)$ be? Justify your answer.

   justification (+1)

   use facts right like $f(4) = 4$ (+.5)

   start (+.5)

   $f(6)$ must be bigger than 8 b/c function will be above line drawn

   OR

   MVT $\Rightarrow$ there is a c between 4 & 6

   so $f'(c) = \frac{f(6) - f(4)}{6 - 4} = \frac{f(6) - 4}{2}$

   b/c $f'(c) > 2 \Rightarrow \frac{f(6) - 4}{2} > 2$

   $\Rightarrow f(6) - 4 > 4 \Rightarrow f(6) > 8$

3. Consider a sports team that plays in a stadium that holds 54,000 spectators. With ticket prices at \$10, the average attendance has been 5,000. When ticket prices were lowered to \$8, the average attendance rose to 15,000.

   (a) [3] Define variables and find a function relating the attendance to the price of tickets.

   (+1) A = attendance (ave), p = price of tickets

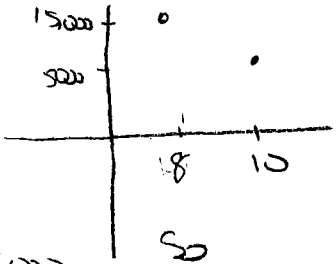
   (+.5) only 2 points given, let's assume linear

   $A - A_1 = m(p - p_1)$

   (p, A)

   (+.5) $(10, 5{,}000)$, $(8, 15{,}000)$

   (+.5) $m = \frac{15{,}000 - 5000}{8 - 10} = \frac{10{,}000}{-2} = -5{,}000$

   so

   (+.5) plug in $A - 5000 = -5000(p - 10)$

   or

   $A = -5000p + 50{,}000 + 5000$

   $A = -5000p + 55{,}000$

   (b) [2] Find the revenue as a function of ticket prices.

   start (+.5)

   (+.5) Revenue = price · # of tickets sold

   $= p \cdot A$ (into variables)

   $= p(-5000p + 55{,}000)$ sub in (+1)