

# Math 133

Quiz 4 Sample

October 14, 2008

You may use your calculator. Indicate any calculations you do with the calculator and show your algebra whenever calculations are done by hand.

1. (10 pts.) Let  $f(x) = 3x - x^2$ . The graph of  $f(x)$  is shown in the following figure.

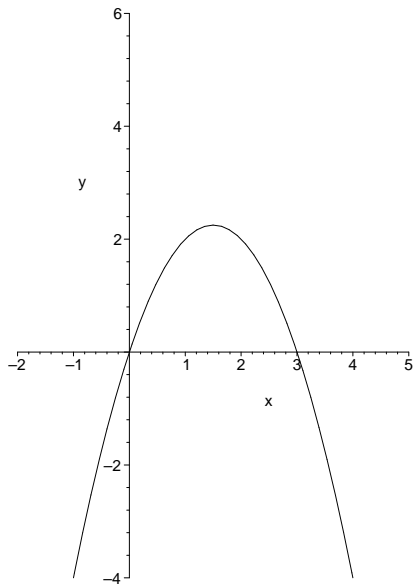


Figure 1:

- (a) Write out the difference quotient formula for  $m_{sec}$  at a general point  $x_0$ . (Express your formula in terms of  $x_0$  and  $h$ .)

(b) Use your formula from part (a) to obtain a formula for the slope of the secant line at  $x_0 = 2$ .

(c) On the graph, sketch the secant lines for  $x_0 = 2$  and the  $h$  values  $h = -1$  and  $h = -2$ .

(d) Use your formula from (b) to compute  $m_{tan}$  by taking a limit.

(e) Find an equation  $y = mx + b$  for the tangent line to the graph of  $f(x)$  at  $x_0 = 2$ .

2. (5 pts.) The function  $f(x) = \frac{\tan(x)}{x}$  has a discontinuity at  $x = 0$ . Is it a removable discontinuity, a jump discontinuity or neither? Explain your answer. (You may use a table of values or a graph to justify your answer. If you use a graph, make sure the window you use is not too large.)