Math 1B (7:30am – 8:20am)
Quiz 1 Version A
Fri Sep 24, 2010

NAME YOU ASKED TO BE CALLED: _____

SCORE: ___ / 20 POINTS

Some values for a function f are given in the table below. **SCORE: ___ / 3 POINTS**

Estimate the slope of the tangent line to $y = f(x)$ at $x = 5$ by averaging the slope of 2 **appropriate** secant lines.
Show the calculations that lead to your answers.

x	1	3	5	7	9	11
$f(x)$	–2	2	6	4	12	8

$$\frac{6-2}{5-3} = 2 \qquad \frac{4-6}{7-5} = -1$$

$$\frac{2+(-1)}{2} = \frac{1}{2}$$

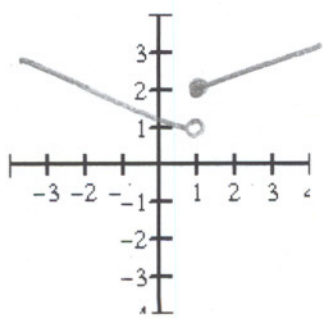
The position of an object travelling along a straight line is given by $s(t) = t^3 - 2t$. **SCORE: ___ / 3 POINTS**

Find the average velocity of the object for the time period beginning when $t = 3$ and lasting 0.1 second.
Show the calculations that lead to your answers.

$$\frac{s(3.1) - s(3)}{3.1 - 3} = \frac{23.591 - 21}{.1} = 25.91$$

Sketch the graph of a function f such that **SCORE: ___ / 3 POINTS**

$f(1)$ exists,
$\lim_{x \to 1^-} f(x)$ exists,
$\lim_{x \to 1^+} f(x)$ exists and
$\lim_{x \to 1} f(x)$ does not exist.



CONTINUED ON OTHER SIDE

The point $P(1, 3)$ lies on the curve $y = \sqrt{x^2 + 8}$. $\frac{\sqrt{x^2+8}-3}{x-1}$ **SCORE: ___ / 7 POINTS**

(a) If Q is the point $(x, \sqrt{x^2 + 8})$, use your calculator to find the slope of the secant line PQ (correct to three decimal places) for the following values of x:

x	0.5	0.9	0.99	0.999	1.001	1.01	1.1	1.5
slope of secant line	0.255	0.318	0.332	0.333	0.333	0.335	0.348	0.403

(b) Using the results of part (a), guess the value of the slope of the tangent line to the curve at $P(1, 3)$.

$0.\overline{3}$ OR $\frac{1}{3}$

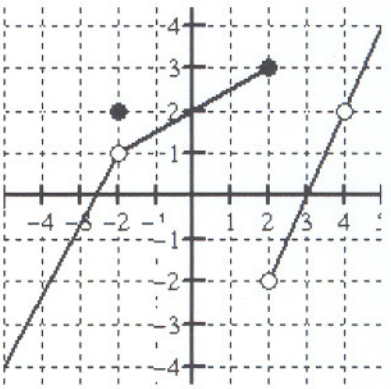
(c) Using the slope from part (b), find an equation of the tangent line to the curve at $P(1, 3)$.

$y - 3 = \frac{1}{3}(x-1)$

OR

$y = 3 + \frac{1}{3}(x-1)$ OR $y = \frac{1}{3}x + \frac{8}{3}$

The graph of a function f is shown on the right. State the values of the following expressions, if they exist. Write DNE where appropriate. **SCORE: ___ / 4 POINTS**



[a] $f(2)$ 3

[b] $\lim_{x \to 2^+} f(x)$ -2

[c] $\lim_{x \to 2} f(x)$ DNE

[d] $f(-2)$ 2

[e] $\lim_{x \to -2} f(x)$ 1

[f] $\lim_{x \to 3} f(x)$ 0

[g] $f(4)$ DNE

[h] $\lim_{x \to 4} f(x)$ 2