Math 1A (9:30am – 10:20am)
Quiz 1
Fri Jan 16, 2009

SCORE: ___ / 20 POINTS

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your social security number ? ___ ___
[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]

NO CALCULATORS ALLOWED

Give the definition of "continuous at a point". **SCORE: ___ / 2 POINTS**

f IS CONTINUOUS AT $x=a$ IF
$f(a)$ EXISTS, $\lim_{x\to a} f(x)$ EXISTS AND $\lim_{x\to a} f(x) = f(a)$

$\frac{1}{2}$ POINT EACH

←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙

Evaluate the following limits. **Show supporting work.** **SCORE: ___ / 7 POINTS**
If a limit does not exist, write DNE, and show supporting work and/or give a ***brief*** explanation.

[a] $\lim_{x\to -3^+} \sqrt{x^2-9}$ DNE

IF $x \approx -3$
AND $x > -3$ (EG. $x = -2.99$)
THEN $x^2 < 9$
SO $x^2 - 9 < 0$
AND $\sqrt{x^2-9}$ IS UNDEFINED

1 POINT EACH

[b] $\lim_{x\to 1}\left(\frac{1}{x-1} - \frac{2}{x^2-1}\right)$

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

←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙←↖↑↗→↘↓↙

For the position function $f(t) = t^2 + 3t$, find the velocity at time $t = 3$. **DO NOT USE DERIVATIVES.** **SCORE: ___ / 3 POINTS**

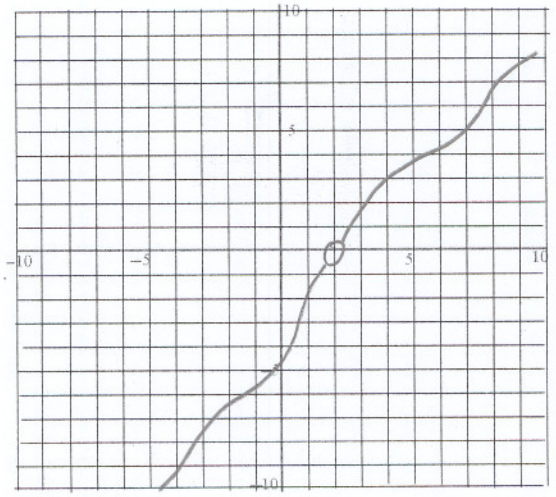
$\lim_{h\to 0} \frac{f(3+h)-f(3)}{h}$
$= \lim_{h\to 0} \frac{(3+h)^2 + 3(3+h) - 18}{h}$
$= \lim_{h\to 0} \frac{9+6h+h^2+9+3h-18}{h}$
$= \lim_{h\to 0} \frac{9h+h^2}{h}$
$= \lim_{h\to 0} (9+h)$
$= 9$

1 POINT EACH

CONTINUED ON OTHER SIDE

Sketch a function f such that $\lim_{x\to 2} f(x)$ exists but $f(2)$ does not exist.

SCORE: ___ / 2 POINTS



INFINITELY MANY ANSWERS

Determine if the function below is continuous at $x = 1$.
If it is not continuous, state which of the conditions is not met.

SCORE: ___ / 3 POINTS

$$f(x) = \begin{cases} 3-x & \text{if } x \le -2 \\ x+6 & \text{if } -2 < x < 1 \\ 5x+2 & \text{if } x > 1 \end{cases}$$

f(1) DNE, so f IS NOT CONTINUOUS AT x = 1

2 1

IF YOU THOUGHT f WAS CONTINUOUS AT x = 1 AND YOU SHOWED THAT $\lim_{x\to 1^-} f(x) = \lim_{x\to 1^+} f(x) = 7$, GIVE YOURSELF 1 POINT TOTAL (YOU'RE STILL WRONG)

[MULTIPLE CHOICE] Find $\lim_{x\to 0} f(x)$ where $f(x) = \begin{cases} 5-2x & \text{if } x < 1 \\ 4 & \text{if } x = 1 \\ 2x+3 & \text{if } x > 1 \end{cases}$.

SCORE: ___ / 2 POINTS

[a] 3 [b] 4 [c] 5 [d] does not exist

LETTER OF CORRECT ANSWER: [C] 2 POINTS

MONDAY IS MARTIN LUTHER KING DAY
ENJOY THE LONG WEEKEND
BUT GET READY FOR THE MIDTERM