Math 1A (7:30am – 8:20am)
Quiz 3
Fri Oct 17, 2008

SCORE: ___ / 20 POINTS

What day of the month is your birthday ? ___ ___
What are the last 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

Complete the following definition: **SCORE: ___ / 3 POINTS**

The derivative of the function f is $\lim_{h\to 0} \dfrac{f(x+h)-f(x)}{h}$ (1, 2)

Use the definition of the derivative to find the derivative of $f(x) = \sqrt{2-5x}$. **SCORE: ___ / 5 POINTS**

NO DIFFERENTIATION SHORTCUTS ALLOWED.

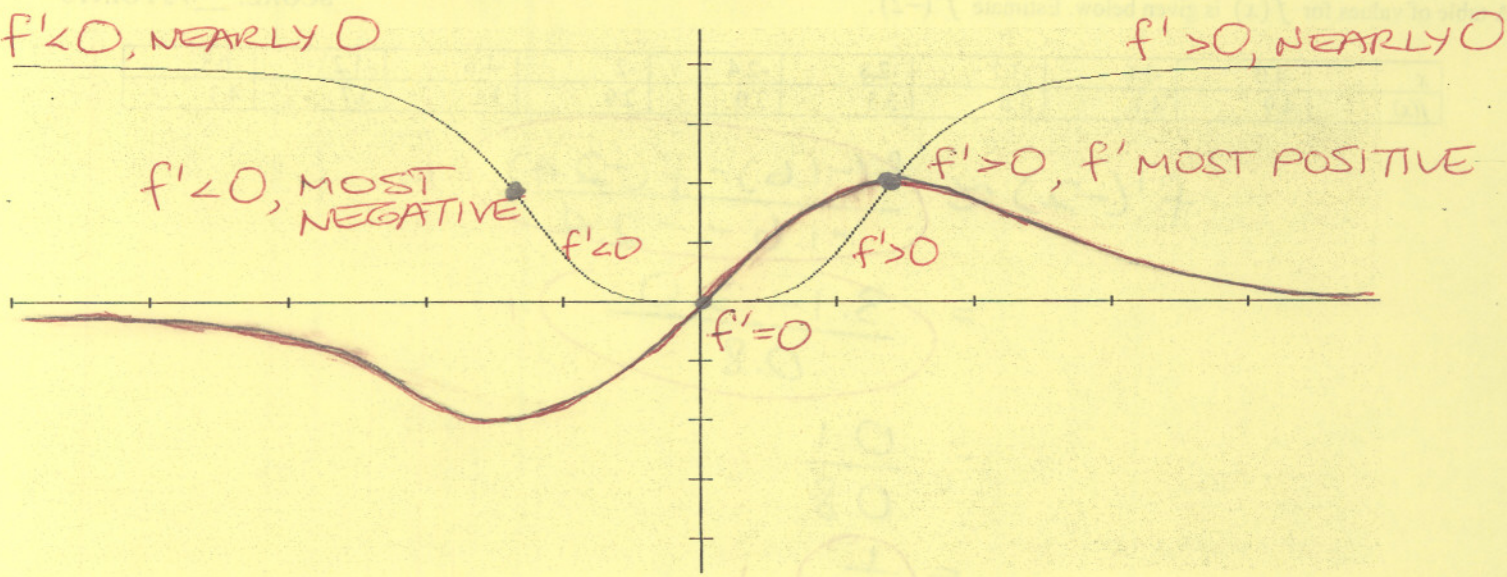
$$f'(x) = \lim_{h\to 0} \frac{\sqrt{2-5(x+h)} - \sqrt{2-5x}}{h} \quad (2)$$

$$= \lim_{h\to 0} \frac{2-5(x+h)-(2-5x)}{h\left(\sqrt{2-5(x+h)}+\sqrt{2-5x}\right)} \quad (1)$$

$$= \lim_{h\to 0} \frac{2-5x-5h-2+5x}{h\left(\sqrt{2-5(x+h)}+\sqrt{2-5x}\right)} = \lim_{h\to 0} \frac{-5}{\sqrt{2-5(x+h)}+\sqrt{2-5x}} \quad (1)$$

$$= \frac{-5}{2\sqrt{2-5x}} \quad (1)$$

The graph of $f(x)$ is shown below. On the same axes, sketch a graph of $f'(x)$. **SCORE: ___ / 4 POINTS**



QUESTIONS ON OTHER SIDE

Use the definition of the derivative to find the derivative of $f(x) = \frac{4}{1-5x}$.

SCORE: ___ / 5 POINTS

NO DIFFERENTIATION SHORTCUTS ALLOWED.

$$f'(x) = \lim_{h\to 0} \frac{\frac{4}{1-5(x+h)} - \frac{4}{1-5x}}{h} \quad 2$$

$$= \lim_{h\to 0} \frac{4(1-5x) - 4(1-5(x+h))}{h(1-5(x+h))(1-5x)} \quad 1$$

$$= \lim_{h\to 0} \frac{4-20x-4+20x+20h}{h(1-5(x+h))(1-5x)} = \lim_{h\to 0} \frac{20}{(1-5(x+h))(1-5x)} \quad 1$$

$$= \frac{20}{(1-5x)^2} \quad 1$$

A table of values for $f(x)$ is given below. Estimate $f'(-2)$.

SCORE: ___ / 3 POINTS

x	-4.0	-3.6	-3.2	-2.8	-2.4	-2	-1.6	-1.2	-0.8
$f(x)$	4.9	4.1	3.6	3.5	3.0	2.9	3.1	3.7	4.3

$$f'(-2) \approx \frac{f(-1.6) - f(-2.4)}{-1.6 - -2.4} \quad 1$$

$$= \frac{3.1 - 3.0}{0.8} \quad 1$$

$$= \frac{0.1}{0.8}$$

$$= \frac{1}{8} \quad 1$$