Quiz

Directions: Carefully read each question below and answer to the best of your ability in the space provided. You **MUST** show your work to receive full credit!

1. (5 points) Suppose $f(x) = 2x^2 - 4x - 5$. Find the intervals on which $f(x)$ is increasing and the intervals on which $f(x)$ is decreasing.

Solution: Remember that a function g is increasing on the interval where $g'(x) > 0$ and is decreasing on the interval where $g'(x) < 0$. Thus, we need to take a derivative of our function $f(x)$ first and then find solutions(intervals) for the inequalities $f'(x) > 0$ and $f'(x) < 0$. Let us take derivative of $f(x)$ first, that is

$$f'(x) = 4x - 4,$$

and now look at the inequalities $f'(x) > 0$ and $f'(x) < 0$,

$$f'(x) > 0 \iff 4x - 4 > 0 \iff x > 1,$$

and

$$f'(x) < 0 \iff 4x - 4 < 0 \iff x < 1.$$

Thus, our function $f(x)$ is increasing on the interval $(1, +\infty)$ and decreasing on the interval $(-\infty, 1)$.

2. (5 points) Find the value of x on the interval $[-1, 4]$ at which $f(x) = 2x^2 - 4x - 5$ (same as above) attains its minimum. *Be sure to justify your answer.*

Solution: By the work above and the first derivative test, we see that $f(x)$ attains its minimum at $x = 1$. Alternatively, using only $f'(x)$ from above, the only critical number of f is 1 and $f(-1) = 1, f(1) = -7$, and $f(4) = 11$, so we again conclude that $f(x)$ attains its minimum at $x = 1$.

Name: _____

Section (circle one): 021 022 023 024

Question:	1	2	Total
Points:	5	5	10
Score:			