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) Consider the function

$$g(x) = \begin{cases} x^2 & x \leq 2 \\ A - 5x & x > 2 \end{cases}$$

What value of A will make $g(x)$ continuous at $x = 2$?

> **Solution:** For the function $g(x)$ to be continuous at $x = 2$, $\lim\limits_{x \to 2} g(x)$ has to exist and $\lim\limits_{x \to 2} g(x) = g(2)$. But $\lim\limits_{x \to 2} g(x)$ would exist if and only if $\lim\limits_{x \to 2^-} g(x) = \lim\limits_{x \to 2^+} g(x)$. Clearly, $g(2) = (2)^2 = 4$. Now, we have
>
> $$\lim_{x \to 2^-} g(x) = \lim_{x \to 2^-} (x^2) = 4 \quad \text{and}$$
> $$\lim_{x \to 2^+} g(x) = \lim_{x \to 2^+} (A - 5x) = A - 10.$$
>
> So, we would have to set $4 = A - 10$ and solve it for A, clearly, $A = 14$.

2. (5 points) Consider the function

$$f(x) = \left| x^2 + 7x + 6 \right|.$$

For what value(s) of x is $f(x)$ <u>not</u> differentiable?

> **Solution:** The function is not differentiable at the points where it touches the x-axis. Factoring $x^2 + 7x + 6 = (x + 6)(x + 1)$, we find that $f(x)$ is not differentiable at $x = -6$ and $x = -1$.

Name: _____

Section (circle one):   021   022   023   024

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