Name: ______________________________ Section: ____________________

**MA 114 QUIZ #2**

September 11, 2014

The following quiz is worth 4 points. Each problem will be worth 2 points. Be sure to read the problem carefully and answer every part of the problem. Be sure to show all of your work. Answers without support will not receive any credit.

1. Compute the surface area for a revolution about the $x-$axis over the given interval:

$$f(x) = 3x^3 \text{ over } [0,2].$$

$S = 2\pi \int_0^2 3x^3\sqrt{1+(9x^2)^2}dx = 2\pi \int_0^2 3x^3\sqrt{1+81x^4}dx$. Now take $u = 1+81x^4, du = 4*81x^3dx$. Then $S = 2\pi \int \frac{3}{81(4)}u^{1/2}du = \frac{\pi}{81}u^{3/2}| = \frac{\pi}{81}(1+81x^4)^{3/2}|_0^2 = 576.654\pi \approx 1811.613$.

1 point for setting up the integral correctly, 1 point for solving the integral correctly.

2. Set up the integral to find the arc length of the following curve. Are the assumptions on the arc length formula satisfied for the given function?

$$f(x) = 3\cos(x) \text{ from } x = 0 \text{ to } x = \pi/2.$$

In order to use the arc length formula, $f'(x)$ must exist and be continuous on $[0, \pi/2]$. Then $s = \int_0^{\pi/2}\sqrt{1+(-3\sin(x))^2}dx = \int_0^{\pi/2}\sqrt{1+9\sin^2(x)}dx$. Yes, the assumptions are satisfied becuase $f'(x) = -3\sin(x)$ exists and is continuous for all $x \in [0, \pi/2]$.

1 point for setting the integral up correctly, 1 point for getting the assumptions correct.