Math 241 - Quiz 3 - Thursday, October 13

Your name here:

1. Find the arc length of the curve C described by $x = y^{3/2}$ and with endpoints $(0,0)$ and $(\frac{8}{3\sqrt{3}}, \frac{4}{3})$. (4 points)

Arc Length =

2. Let $\mathbf{F}(x,y) = (y^2 \cos x, 2y \sin x + 1)$
and let C be the curve from $(0,0)$ to $(\frac{\pi}{2}, \frac{\pi^3}{8})$ parametrized by $\mathbf{r}(t) = (t, t^3)$. Use the Fundamental Theorem for Line Integrals to compute $\int_C \mathbf{F} \cdot d\mathbf{r}$. (4 points)

$\int_C \mathbf{F} \cdot d\mathbf{r} =$

(**OVER**)

3. You are asked to paint one side of a fence. The fence is not straight; the curve traced out by the base is a quarter circle with radius 2. For convenience, let us imagine this is the quarter circle in the first quadrant (with endpoints $(2, 0)$ and $(0, 2)$). The height of the fence varies according to the x coordinate by the function $6 - \frac{x}{10}$.

   Set up, but **do not solve**, an integral to measure the area of the fence to be painted.
   (2 points)