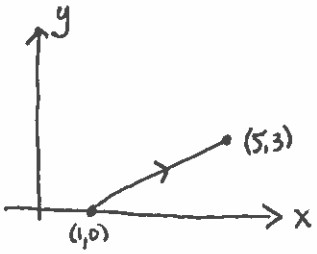
MAT 397, Section 001, Spring 2016 **Quiz 9, April 25**

Name: Caleb McWhorter (Solutions)

Problem 1 (10 points) Evaluate $\int_C xds$ where C is given by $\mathbf{r}(t) = \langle 4t + 1, 3t \rangle$, $0 \leq t \leq 1$.



$\vec{r}(t) = \langle 4t+1, 3t \rangle$

$r'(t) = \langle 4, 3 \rangle$

$|r'(t)| = \sqrt{4^2 + 3^2} = \sqrt{16+9} = 5$

$$\int_C x\,ds = \int_0^1 (4t+1) \cdot 5\,dt$$

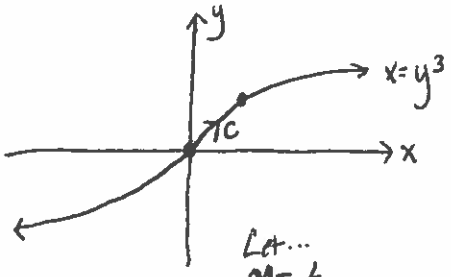
$$= 5\int_0^1 4t+1\,dt$$

$$= 5\left[2t^2 + t\right]_0^1$$

$$= 5(2+1)$$

$$= 15$$

Problem 2 (10 points) Evaluate $\int_C x^2 dy$ where C is the arc of the curve $x = y^3$ from (0,0) to (1,1).



Let...

$y = t$

then...

$x = t^3$

$0 \leq t \leq 1$

$dy = dt$

$$\int_C x^2\,dy = \int_0^1 (t^3)^2\,dt$$

$$= \int_0^1 t^6\,dt$$

$$= \frac{t^7}{7}\Big|_0^1$$

$$= 1/7$$