Math 210 (Lesieutre)
Quiz 9
April 3, 2017

Name: _____

Problem 1. *Let* $\mathbf{F} = \langle 3x^2, y \rangle$*, and let* C *be a straight line path from* $(0,0)$ *to* $(1,2)$*. Compute* $\int_C \mathbf{F} \cdot d\mathbf{r}$*.*

The parametrization of this one is easy: we want to use

$$\mathbf{r}(t) = \langle t, 2t \rangle$$

with $0 \leq t \leq 1$. Then $\mathbf{r}'(t) = \langle 1, 2 \rangle$.

Plugging in $x(t) = t$ and $y(t) = 2t$ to our vector field, we get

$$\int_C \mathbf{F} \cdot d\mathbf{r} = \int_0^1 \langle 3t^2, 2t \rangle \cdot \langle 1, 2 \rangle \, dt = \int_0^1 3t^2 + 4t \, dt = \left(t^3 + 2t^2 \right) \Big|_0^1 = 3 - 0 = 3.$$