Name:_____

Math 2030, Winter 2011, Quiz 12
8 April 2011
R. Bruner

Let C be the curve paramaterized by $\mathbf{r}(t) = (x(t), y(t)) = (1 - t^2, 1 + t)$ for t in $[0, 1]$. Find

1. dx
2. dy
3. the value of the line integral $\int_C 2x\,dx - y\,dy$.

$x = 1 - t^2$
$y = 1 + t$

1. $dx = -2t\,dt$

2. $dy = dt$

3. $$\int_C 2x\,dx - y\,dy = \int_0^1 2(1-t^2)(-2t\,dt) - (1+t)\,dt$$

$$= \int_0^1 -4t(1-t^2) - (1+t)\,dt$$

$$= \int_0^1 -4t + 4t^3 - 1 - t\,dt$$

$$= \int_0^1 4t^3 - 5t - 1\,dt = t^4 - \frac{5}{2}t^2 - t\Big|_0^1$$

$$= 1 - \frac{5}{2} - 1 = \boxed{-\frac{5}{2}}$$