Math2E - Practice Midterm 1

1. Use the chain rule to find g'(t), where g(t) = f(x(t), y(t)), $f(x, y) = x^2y + y^2$, $x(t) = e^{4t}$ and $y(t) = \sin t$.

2. Evaluate $\iint_R (y-4x)dA$, where R is bounded by y=4x+2,y=4x+5,y=3-2x, and y=1-2x.

3. Evaluate $\int_C 2x ds$, where C is the portion of $y = x^2$ from (-2,4) to (2,4).

4. Evaluate $\int_C 3y^2 dy$, where C is the quarter-circle $x^2 + y^2 = 4$ from (0,2) to (-2,0).

- 5. $\mathbf{F}(x,y) = (xe^{x^2} 2, \sin y)$ (a): Find a function f such that $\mathbf{F} = \nabla f$; (b): Evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$, where C is the portion of the parabola $y = x^2$ from (-2,4)to (2,4).