

Quiz 13; Wednesday, April 27
MATH 53 with Professor Stankova
Section 116; 3-4
GSI: Eric Hallman

Student name:

You have 10 minutes to complete the quiz. Calculators are not permitted, and remember to show your calculations and explain your reasoning in order to receive full credit.

1. If $\mathbf{F}(x, y) = \langle ye^x, 2e^x \rangle$, find the work that the force field \mathbf{F} does on a goat that runs once **counter-clockwise** around the rectangle with vertices at $(0,0)$, $(3,0)$, $(3,4)$, and $(0,4)$.

Use Green's Theorem:

$$\begin{aligned}\int_C \mathbf{F} \cdot d\mathbf{x} &= \int_C P dx + Q dy \\ &= \iint_D \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} dA \\ &= \iint_D 2e^x - e^x dA \\ &= \int_{x=0}^3 \int_{y=0}^4 e^x dy dx \\ &= \int_{x=0}^3 4e^x dx \\ &= 4e^3 - 4.\end{aligned}$$