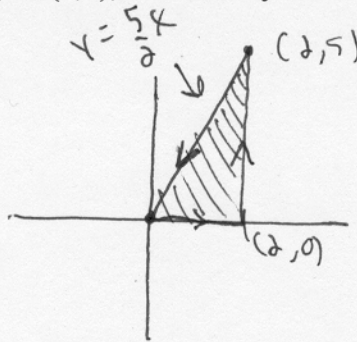Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Let C be the path consisting of the triangle formed by the line segment from the origin to (2,0), followed by the line segment from (2,0) to (2,5), and then by the line segment from (2,5) back to the origin. Compute $\int_C \langle -y, 2x \rangle \cdot d\vec{r}$.

$y = \frac{5x}{2}$ (2,5)

(2,0)

By greens Theorem,

$$\int_C \langle -y, 2x \rangle \cdot d\vec{r} = \int\int_D (2 - (-1)) \, dA$$

$$= \int_0^2 \int_0^{\frac{5}{2}x} 3 \, dy \, dx$$

$$= \int_0^2 \left. 3y \right|_0^{\frac{5}{2}x} dx = \int_0^2 3\left(\frac{5}{2}x\right) dx = \frac{15}{2} \int_0^2 x \, dx$$

$$= \frac{15}{2} \left. \frac{x^2}{2} \right|_0^2 = \frac{15}{2}\left(\frac{4}{2}\right) = 15 \qquad \textit{Excellent}$$

$$\left(\text{or } \int \text{ culd have just said} \qquad \int\int 3 \, dA = 3 \times [\text{Area of triangle}] \right.$$

Yes!

$$\left. = 3 \times 5 = 15 \right)$$