Math 3298 Worksheet 29: Green's Theorem

Group members (2 to 4): _____

(1) Use Green's theorem ($\oint_C \vec{F} \cdot d\vec{r} = \int \int_R (\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y})\, dA$, where $\vec{F} = (P, Q)$) to evaluate the following integral:

$$\oint_C \vec{F} \cdot d\vec{r} = \oint_C xe^{2x}\, dx - 3x^2 y\, dy$$

where C is the quarter unit circle in the positive quadrant (i.e. the line segment from $(0, 1)$ to $(0, 0)$, the line segment from $(0, 0)$ to $(1, 0)$, and the arc of the unit circle from $(1, 0)$ to $(0, 1)$).