Math 3298 Worksheet 31: Green's Theorem

Group members (2 to 4): _____

(1) Use Green's theorem: $\oint_C \vec{F} \cdot d\vec{r} = \int\int_R (\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y})\, dA$, (with $\vec{F} = (P, Q)$), to evaluate $\oint_C \vec{F} \cdot d\vec{r}$ without doing the line integral in the case that $F = (xe^{2x}, -3x^2y)$, and where 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 $(0, 1)$.