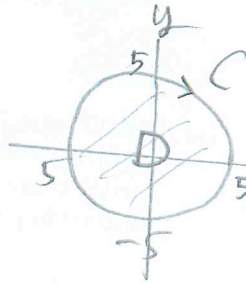
16.4.15

$$\vec{F}(x,y) = \langle \underbrace{e^x + x^2y}_{P},\ \underbrace{e^y - xy^2}_{Q} \rangle$$



$$\int_C \vec{F}\cdot d\vec{r} = \int_C (e^x + x^2y)\,dx + (e^y - xy^2)\,dy$$

to get the positive orientation of the curve

$$\overset{2}{=} -\int_{-C} (e^x + x^2y)\,dx + (e^y - xy^2)\,dy$$

Green's theorem

$$= -\iint_D \left[\frac{\partial}{\partial x}(e^y - xy^2) - \frac{\partial}{\partial y}(e^x + x^2y)\right] dA \quad 1 \quad 1$$

$$= -\iint_D (-y^2 - x^2)\, dA \quad 1 \quad 1$$

$$= \iint_D (x^2+y^2)\, dA \quad 1$$

$$= \int_{\theta=0}^{2\pi}\int_{r=0}^{5} r^2\ \underbrace{r\,dr\,d\theta}_{dA} \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1$$

$$= \left(\int_{r=0}^{5} r^3\,dr\right)\left(\int_{\theta=0}^{2\pi} d\theta\right)$$

$$= 2\pi \left[\frac{r^4}{4}\right]_0^5 \quad 1$$

$$= \frac{625\pi}{2} \simeq 981.7477. \quad 1$$