$F(x,y) = x^2\hat{i} + xy\hat{j}$

$x^2 + y^2 = 4$

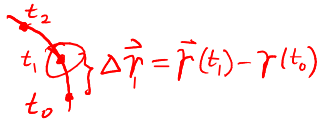
$\vec{r}(t) = \langle 2\cos t, 2\sin t \rangle$

$\vec{F}(\vec{r}(t)) = \langle 4\cos^2 t, 4\sin t\cos t \rangle$

$\vec{r}\,'(t) = \langle -2\sin t, 2\cos t \rangle$

$$\int_C \vec{F}\cdot d\vec{r} = \int_0^{2\pi} \langle 4\cos^2 t, 4\sin t\cos t \rangle \cdot \langle -2\sin t, 2\cos t \rangle \, dt$$

$$\Rightarrow \int_0^{2\pi} -8\sin t\cos^2 t + 8\sin t\cos^2 t \, dt = \int_0^{2\pi} 0\, dt = 0$$



$W_1 = F(\vec{r}(t_1)) \cdot \Delta\vec{r}_1$

$W_2 = W_1 + F(\vec{r}(t_2)) \cdot \Delta\vec{r}_2$

$W_3 = \cdots$

$$W = \sum_{i=1}^{n} \vec{F}(\vec{r}(t_i)) \cdot \Delta\vec{r}_i$$

n = number of divisions of circle