

(5)

(4) $F = \left(\frac{-y}{x^2+y^2}, \frac{x}{x^2+y^2} \right)$

(4a)

$$\int_{\gamma} F \cdot d\gamma = \int_0^{2\pi} F(\gamma(t)) \cdot \gamma'(t) dt$$

$$\gamma(t) = (\cos t, \sin t) \quad \gamma'(t) = (-\sin t, \cos t)$$

$$F(\gamma(t)) = \left(\frac{-y}{1}, \frac{x}{1} \right) \circ \left(\overset{x}{\cos t}, \overset{y}{\sin t} \right)$$

$$= (-\sin t, \cos t)$$

$$\int_0^{2\pi} (-\sin t, \cos t) \cdot (-\sin t, \cos t) dt = \int_0^{2\pi} 1 dt$$

$$= 2\pi$$