

$$4. \int_C \partial xy \quad C: \vec{r}(t) = \underbrace{\partial t}_{x(t)} \vec{i} + \underbrace{4t}_{y(t)} \vec{j} \quad 0 \leq t \leq 1$$

$$x(t) = \partial t \quad y(t) = 4t$$

$$f(x, y) = \partial xy$$

$$f(x(t), y(t)) = \partial (\partial t)(4t) = 16t^2$$

$$\int_a^b f(x(t), y(t)) \sqrt{(x'(t))^2 + (y'(t))^2} dt$$

$$x'(t) = \partial$$

$$y'(t) = 4$$

$$\int_0^1 16t^2 \sqrt{\partial^2 + 4^2} dt$$

$$= \sqrt{20} \cdot 16 \int_0^1 t^2 dt$$

$$= 2\sqrt{5} \cdot 16 \left[\frac{1}{3} t^3 \right]_0^1$$

$$= 32\sqrt{5} \left[\frac{1}{3} (1)^3 - \frac{1}{3} (0)^3 \right]$$

$$= \frac{32\sqrt{5}}{3}$$