

$$15. f(x, y) = 3x^2 y$$

$$f(x(t), y(t)) = 3(2t)^2 (5t)$$

$$= 3 \cdot 4t^2 \cdot 5t$$

$$= 60t^3$$

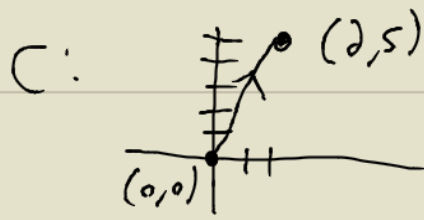
$$LSA = \int_0^1 60t^3 \sqrt{29} dt$$

$$= 60\sqrt{29} \int_0^1 t^3 dt$$

$$= 60\sqrt{29} \left[\frac{1}{4} t^4 \right]_0^1$$

$$= \frac{60\sqrt{29}}{4} [1 - 0]$$

$$= 15\sqrt{29}$$



$$(0,0) \text{ to } (2,5)$$

$$x(t) = 2t \quad y(t) = 5t \quad 0 \leq t \leq 1$$

$$\vec{r}(t) = 2t \vec{i} + 5t \vec{j}$$

$$\vec{r}' = 2 \vec{i} + 5 \vec{j}$$

$$\|\vec{r}'\| = \sqrt{2^2 + 5^2}$$
$$= \sqrt{29}$$