

$$5. \int_C \underbrace{(4xy)}_M dx + \underbrace{(2x^2 + 2y^2)}_N dy \quad \frac{\partial M}{\partial y} = 4x \quad \frac{\partial N}{\partial x} = 4x$$

f_x f_y YES

$$f = \int 4xy \, dx$$

$$f = \int (2x^2 + 2y^2) \, dy$$

$$f = \underline{2x^2 y}$$

$$f = \underline{2x^2 y} + \frac{2}{3} y^3$$

$$f(x, y) = 2x^2 y + \frac{2}{3} y^3$$

$$(0, 2)$$

$$(3, 0)$$

$$f \left(\begin{matrix} 0 \\ x \end{matrix}, \begin{matrix} 2 \\ y \end{matrix} \right)$$

$$f \left(\begin{matrix} 3 \\ x \end{matrix}, \begin{matrix} 0 \\ y \end{matrix} \right)$$

$$= 2(0)^2(2) + \frac{2}{3}(2)^3 - \left(2(3)^2(0) + \frac{2}{3}(0)^3 \right)$$

$$= \left(\frac{16}{3} \right)$$