

2.4 #3
M

$$(5x+4y)dx + (4x-8y^3)dy = 0$$

$$\frac{\partial M}{\partial y} = 4$$

$$\frac{\partial N}{\partial x} = 4$$

Exact 😊

$$\frac{\partial S}{\partial x} = 5x + 4y$$

$$\frac{\partial S}{\partial y} = 4x - 8y^3$$

$$S = \int 5x + 4y dx$$

$$S = \frac{5}{2}x^2 + 4yx + g(y)$$

$$\frac{\partial S}{\partial y} = 0 + 4x + g'(y) = 4x - 8y^3$$

$$g'(y) = -8y^3 \quad g(y) = -8 \frac{y^4}{4}$$

$$\boxed{\frac{5}{2}x^2 + 4yx - 2y^4 = C}$$