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HOMEWORK EXAMPLES

Finding a potential function

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Problem 1.3.24:

Find a potential function f for the vector field

$$\vec{F} = \langle 2xy, x^2 + 1 \rangle .$$

Solution:

$$f = \int (2xy) dx = x^2y + c(y).$$

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$$f_y = x^2 + c'(y) = x^2 + 1, \text{ so}$$

$$c'(y) = 1, \quad c(y) = y, \text{ and}$$

$$f = f(x, y) = x^2y + y.$$