HOMWORK EXAMPLES

Finding a potential function

B. Dodson

Math 205, Fall 2004
Problem 1.3.24:

Find a potential function $f$ for the vector field

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

Solution:

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

\[ f_y = x^2 + ct(y) = x^2 + 1, \text{ so} \]

\[ ct(y) = 1, \quad c(y) = y, \quad \text{and} \]

\[ f = f(x, y) = x^2y + y. \]