variables = [var('x'), var('y')] f = sum([randint(-4,4) * prod([v**randint(0,2) for v in variables]) for $_inrange(3)])gradient = [derivative(f,v)forvinvariables]$

Exercise 1 *Let* $\overrightarrow{\mathbf{F}}(x,y) = \langle gradient[0], gradient[1] \rangle$. *Identify whether* $\overrightarrow{\mathbf{F}}$ *is a gradient field, and if it is, find a potential function* F *such that* $F(0,0) = 0$.

Hint: *You should use the Clairaut gradient test.*

Multiple Choice:

(a) $\overrightarrow{\mathbf{F}}$ *is a gradient field.* ✓

(b) $\overrightarrow{\mathbf{F}}$ *is not a gradient field.*

Exercise 1.1 *A potential function* F *such that* $F(0,0) = 0$ *is:*

$$F(x,y) = \boxed{f - f(x = 0, y = 0)}$$