

QUESTION

Given $f(x, y) = x + y^2 + \sin(xy)$ evaluate $\frac{\partial^2 f}{\partial x \partial y}$.

ANSWER

$$f = x + y^2 + \sin(xy)$$

$$\frac{\partial f}{\partial y} = 2y + x \cos(xy)$$

$$\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial}{\partial x} \left(\frac{\partial f}{\partial y} \right) = 0 + \cos(xy) + x \{-\sin(xy)(y)\} = \cos(xy) - xy \sin(xy)$$