

Quick Hit 7.2 (2)

1. Consider $f(x, y) = yx^2 \ln(3x - 1)$. Compute $f_{yx}(1, 2)$

$$f_y(x, y) = x^2 \ln(3x - 1)$$

$$f_{yx}(x, y) = 2x \ln(3x - 1) + \frac{3x^2}{3x - 1}$$

2. Consider $f(x, y) = xy^2 - 3x + 1$. Suppose that x and y are both functions of t . Namely, $x(t) = e^t + 2t$ and $y(t) = t^3$. What is $\frac{df}{dt}$ in terms of t ?

$$\frac{df}{dt} = \frac{\partial f}{\partial x} \frac{dx}{dt} + \frac{\partial f}{\partial y} \frac{dy}{dt}$$

$$= (y^2 - 3)(e^t + 2) + (2xy)(3t^2)$$

$$= (t^6 - 3)(e^t + 2) + 2(e^t + 2t)(t^3)(3t^2)$$