Name:

1. Consider the function

$$f(x, y) = \sin(xy)$$

- Compute f_x.

- Compute f_{xy}.

- Compute f_{yx}.

2. Suppose $z = f(x, y) = \ln(x - y^2)$. Use the total differential $dz = f_x\,dx + f_y\,dy$ to estimate $f(5.1, 2.2)$. You'll perhaps find it helpful to observe that $f(5, 2) = 0$.

3. Suppose you know

$$\frac{\partial z}{\partial x} = 3, \quad \frac{\partial z}{\partial y} = -2, \quad \frac{dx}{dt} = -3, \quad \frac{dy}{dt} = 4.$$

Compute dz/dt.