Section 13.4

1) $z = 5x^2 y^3$

a) $\frac{\partial z}{\partial x} =$?

b) $\frac{\partial z}{\partial y} =$?

c) $dz = \frac{\partial z}{\partial x} \cdot dx + \frac{\partial z}{\partial y} \cdot dy =$?

2) $z = x \sin y + y \cos x$

a) $\frac{\partial z}{\partial x} =$?

b) $\frac{\partial z}{\partial y} =$?

c) $dz = \frac{\partial z}{\partial x} \cdot dx + \frac{\partial z}{\partial y} \cdot dy =$?

3) $w = x^2 yz^3 + \cos(xz)$

a) $\frac{\partial w}{\partial x} =$?

b) $\frac{\partial w}{\partial y} =$?

c) $\frac{\partial w}{\partial z} =$?

d) $dw = \frac{\partial w}{\partial x} \cdot dx + \frac{\partial w}{\partial y} \cdot dy + \frac{\partial w}{\partial z} \cdot dz =$?

4) $f(x,y) = 25 + x^2 + y^2$

a) $f(1,4) =$?

b) $f(1.01, 4.01) =$?

c) $\Delta z = f(1.01, 4.01) - f(1,4) =$?

Note: $x = 1,\ y = 4,\ \ dx = 1.01 - 1 = 0.01,\ \ \ dy = 4.01 - 4 = 0.01$

d) Evaluate $dw = \frac{\partial f}{\partial x} \cdot dx + \frac{\partial f}{\partial y} \cdot dy = (2x) \cdot dx + (2y) \cdot dy =$?

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

a) $f(1,2) =$?

b) $f(1.01, 2.01) =$?

c) $\Delta z = f(1.01, 2.01) - f(1,2) =$?

Note: $x = 1,\ y = 2,\ \ dx = 1.01 - 1 = 0.01,\ \ \ dy = 2.01 - 2 = 0.01$

d) Evaluate $dw = \frac{\partial f}{\partial x} \cdot dx + \frac{\partial f}{\partial y} \cdot dy = (\sin y) \cdot dx + (x \cos y) \cdot dy =$?