Name:

1. Compute $\dfrac{\partial f}{\partial y}$ if

$$f(x,y,z) = e^{-x^2y} + \ln(y+z) + \sin\left(\frac{x}{z}\right)$$

$$\frac{\partial f}{\partial y} = -x^2 e^{-x^2 y} + \frac{1}{y+z}$$

2. For a function $f(x,y)$ you know that

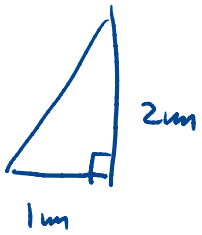
$$f(2,3) = 9$$
$$f_x(2,3) = 3$$
$$f_y(2,3) = -1.$$

Use this information to estimate $f(2.1, 3.2)$.

$$L(x,y) = f(x_0,y_0) + f_x(x_0,y_0)(x-x_0) + f_y(x_0,y_0)(y-y_0)$$
$$L(x,y) = f(2,3) + f_x(2,3)(x-2) + f_y(2,3)(y-3)$$

$$f(2.1, 3.2) \approx L(2.1, 3.2)$$
$$= 9 + 3(2.1-2) - (3.2-3)$$
$$= 9 + \frac{3}{10} - \frac{2}{10}$$
$$= 9 + \frac{1}{10}$$

3. A right triangle has width 1m and height 2m with an error in the measurements of ±0.02m. Estimate the error in the area using a differential.



$$A = xy$$

$$dA = (dx)y + x\,dy$$

$$= (0.02)\cdot 2 + 1\cdot(0.02)$$

$$= 0.04 + 0.02$$

$$= \boxed{0.06\ m^2}$$