Quiz 7

1. Calculate partial derivatives:

$$z = \ln(x^2+y^2)$$

$$\frac{\partial z}{\partial x} = \frac{1}{x^2+y^2} \cdot 2x^2 = \frac{2x^2}{x^2+y^2}$$

$$\frac{\partial z}{\partial y} = \frac{1}{x^2+y^2} \cdot 2y^2 = \frac{2y^2}{x^2+y^2}$$

2. Find equation of tangent line to given surface at point.

$$z = x^2+y^2+2 \quad (1,1,4)$$

Test point: $4 = 1+1+2$ ✓

$$\frac{\partial z}{\partial x} = 2x \qquad \frac{\partial z}{\partial y} = 2y$$

$$f_x(1,1) = 2 \qquad f_y(1,1) = 2$$

$$z-4 = 2(x-1) + 2(y-1)$$

$$z-4 = 2x-2+2y-2$$

$$z = 2x-2+2y-2+4$$

$$\boxed{z = 2x+2y}$$