

L7: 14.3, 14.4 pdf Quiz

10/8/20

1. Compute the partial deriv. w/ respect to x & $y \Rightarrow z = \ln(x^2 + y^3)$

$$\frac{dz}{dx} = z_x = \frac{1}{x^2 + y^3} \cdot (x^2 + y^3)' = \frac{1}{x^2 + y^3} \cdot 2x = \frac{2x}{x^2 + y^3}$$

$$\frac{dz}{dy} = z_y = \frac{1}{x^2 + y^3} \cdot (x^2 + y^3)' = \frac{1}{x^2 + y^3} \cdot 3y^2 = \frac{3y^2}{x^2 + y^3}$$

2. Find an eq. of the tangent plane to the given surface at the specified pt.

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

$x_0 \quad y_0 \quad z_0$

$$(z - z_0) = f_x(x_0, y_0)(x - x_0) + f_y(x_0, y_0)(y - y_0)$$

$$f_x = 2x + 0 + 0 = 2x$$

$$f_y = 0 + 2y + 0 = 2y$$

$$f_x(1, 1) = 2 \cdot 1 = 2$$

$$f_y(1, 1) = 2 \cdot 1 = 2$$

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

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

$$z = 2x + 2y$$