q7 Rahul Paleja

Section: 22

① Compute the partial derivatives with respect to x + y

$$z = \ln(x^2+y^3)$$

$$\frac{df}{dx} = \frac{1}{x^2+y^3} \cdot 2x = \boxed{\frac{2x}{x^2+y^3}}$$

$$\frac{df}{dy} = \frac{1}{x^2+y^3} \cdot 3y^2 = \frac{3y^2}{x^2+y^3}$$

$$= \boxed{\frac{3y^2}{x^2+y^3}}$$

② Find An Equation of The Tangent Plane To The Given surface at the specified point

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

$4 = 1+1+2$ ✓ Point works

$f_x(x,y) = 2x$

$f_y(x,y) = 2y$

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

Equation: $\boxed{z-4 = 2(x-1)+2(y-1)}$

Expanded Form:

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

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

$+4 \qquad +4$

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