

$$2. \quad z = \frac{16}{xy} = f(x, y)$$

$$f_x(x, y) = -\frac{16}{x^2 y}$$

$$f_y(x, y) = -\frac{16}{xy^2}$$

$$f_x(-2, 2) = -\frac{16}{8} = -2$$

$$f_y(-2, 2) = -\frac{16}{-8} = 2$$

Thus a normal to the surface is $\underline{n} = \langle -2, 2, -1 \rangle$.

$$\|\underline{n}\| = \sqrt{(-2)^2 + 2^2 + (-1)^2} = 3$$

A unit normal vector is $\underline{N} = \frac{\underline{n}}{\|\underline{n}\|} = \langle -\frac{2}{3}, \frac{2}{3}, -\frac{1}{3} \rangle$.

The equation of the tangent plane is

$$\underline{n} \cdot (\underline{x} - \underline{x}_0) = 0$$

$$\langle -2, 2, -1 \rangle \cdot \langle x+2, y-2, z+4 \rangle = 0$$

$$-2(x+2) + 2(y-2) - (z+4) = 0$$

$$\boxed{-2x + 2y - z = 12}$$