

$$\# 14 \quad x^2 + y^2 + z^2 = 3xyz$$

Treat as implicit fun of z .

Sol'n: This equation can be written as:

$$F(x, y, z) = 0, \text{ where}$$

$$F(x, y, z) = x^2 + y^2 + z^2 - 3xyz$$

$$\text{So } F_x = 2x - 3yz \quad F_y = 2y - 3xz \quad F_z = 2z - 3xy$$

$$\text{and } \frac{\partial z}{\partial x} = -\frac{F_x}{F_z} = \frac{3yz - 2x}{2z - 3xy}$$

$$\text{and } \frac{\partial z}{\partial y} = -\frac{F_y}{F_z} = \frac{2y - 3xz}{2z - 3xy}.$$