

Problem statement Suppose we know that x , y , and z are always related by the equation

$$z^2 + 3xy^3z + 4x^2y = 11$$

The point $P = (2, 1, -1)$ is on the surface defined by this equation.

a) Do either i) or ii):

i) Compute $U = \frac{\partial z}{\partial x}$. What is the value of U at P ?

ii) Compute $V = \frac{\partial z}{\partial y}$. What is the value of V at P ?

b) If you did i) above, do i) below. If you did ii) above, do ii) below.

i) Compute $S = \frac{\partial U}{\partial y}$. What is the value of S at P ?

ii) Compute $T = \frac{\partial V}{\partial x}$. What is the value of T at P ?