Answer on Question #66018 – Math – Calculus

Question

Find the slope of the tangent at (3,1,1) to the curve of intersection of x=3 and z= x^2y-3xy^2+1.

Solution

The curve of the intersection of $x = 3$ and $z = x^2y - 3xy^2 + 1$ is

$$z = 3^2y - 3*3y^2 + 1 \ \rightarrow \ z = 9y - 9y^2 + 1.$$

Then

$$\frac{dz}{dy} = 9 - 18y.$$

The slope of the tangent is

$$m = \frac{dz}{dy}|_{y=1} = 9 - 18 = -9.$$

Answer: -9.