Answer on Question #40146, Math, Calculus

Find the direction in which the function $f(x,y) = 2xy^2 - 2 = - +$ decreases most rapidly at the point (1, 1).

Solution.

We are given function $f(x,y) = 2xy^2 - 2$. The direction in which the function decreases most rapidly at point $(1,1)$is the unit direction of gradient of that function at that point. The gradient is $\nabla f = (2y^2; 4xy)$, which is $\nabla f = (2; 4)$at point $(1; 1)$. Making this gradient unit, by finding $|\nabla f| = \sqrt{4+16} = \sqrt{20}$, obtain the answer $\vec{e} = \frac{\nabla f}{|\nabla f|} = \frac{1}{\sqrt{20}}(2; 4)$- this is the direction one had to find.