Answer on Question #73689 – Math – Calculus

Question

Determine the direction in which the scalar field $f(x,y) = xy^2 + x^3$. y increase the fastest at the point (1, 2).

Solution

The fastest increase is defined by gradient, i.e., $\nabla f(x,y) = \left(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}\right) = (y^2 + 3x^2, 2xy)$.

Value of gradient at point (1,2) is $\nabla f(1,2) = (2^2 + 3 \cdot 1^2, 2 \cdot 1 \cdot 2) = (7,4)$.

Answer: (7,4).