

Directional Derivatives.

Spring 2016

Attendance Quizzes

February 26, 2016

Quiz 15 Directional Derivatives.

Consider the function:

$$f(x, y, z) = x^3 + y^4 - xyz + 5z.$$

- ① Find $\nabla f(1, -1, -2)$.

Answer: Gradient: $\nabla f = \langle 3x^2 - yz, 4y^3 - xz, -xy + 5 \rangle$.
Evaluates to $\langle 1, -2, 6 \rangle$.

- ② Find the directional derivative $D_w(f)(1, -1, -2)$ where $w = \langle 2, 1, -1 \rangle$. Is the function f increasing or decreasing along w at the point $(1, -1, -2)$?

Answer: $\frac{-6}{\sqrt{6}} = -\sqrt{6}$. Decreasing, since the derivative is negative.