Calculus II, Spring 2016

Quiz 4

Apr 28, 2016

1. Find a tangent vector to the curve given by the intersection of the two surfaces $xyz = 1$ and $x^2 + 2y^2 + 3z^2 = 6$ at the point $(1, 1, 1)$.
2. Find absolute maxima and minima of $f(x, y) = x^2 + xy + y^2 - 6x + 2$ on the rectangular $0 \leq x \leq 5$, $-3 \leq y \leq 3$.
3. Use the method of Lagrangian multiplier (only) to find the maximum and minimum value of $f(x, y, z) = x - 2y + 5z$ on the sphere $x^2 + y^2 + z^2 = 30$.
4. Use Taylor's formula to find the quadratic approximation of $f(x, y) = \dfrac{1}{1 - x - y}$ near the origin.
5. Let $U = f(P, V, T)$ where P, V and T are subject to the constraint $PV = nRT$, n, R are constants. Find $\left(\dfrac{\partial U}{\partial P}\right)_V$ and $\left(\dfrac{\partial U}{\partial T}\right)_V$

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