Calculus II, Fall 2013

Quiz 4

May 02, 2013

Show all details.

1. Let $z = L(x, y)$ be a plane. Write down (need not prove) the definition of '$L(x, y)$ is a tangent plane of $z = f(x, y)$ at $(0, 0, f(0, 0))$'.

2. Suppose that $f(x, y)$ and all its partial derivatives of any order are all continuous. <u>DERIVE</u> Taylor's formula at $(0, 0)$ up to second order. That is, $f(x, y) = p_2(x, y) + R_2(x, y)$, derive formula for the quadratic polynomial p_2 and the remainder term R_2.

3. Use Lagrangian multipliers (and not other methods) to find extreme values of $f(x, y, z) = xy + z^2$ on $x^2 + y^2 + z^2 = 16$.

4. Find the equation of plane normal to the following curve at $(1, 1, -1)$
$$\begin{cases} x^2 + 2y^2 + 3z^2 = 6 \\ x + y - z = 3 \end{cases}$$

5. Evaluate
$$\int_0^2 \int_x^2 y^2 \sin(xy)\ dydx$$

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