Study guide for quiz 05

Quiz problems include both the lecture contents and homework problems.

1. Section 14.2: Review and memorize definitions of limit (page 816 and page 823, in polar coordinates) and continuity (using ε and δ) for functions of two or more variables. Review the examples where the "Two-Path Test for Nonexistence of a Limit" is applicable.

   Note that in equation (1), page 823, "$|r| < \delta$" should be "$0 < |r| < \delta$" instead.

2. Section 14.3: Study how to evaluate $\dfrac{\partial f}{\partial x}$, $\dfrac{\partial f}{\partial y}$ at (x_0, y_0) when $f(x, y)$ is given explicitly, and $\dfrac{\partial z}{\partial x}$, $\dfrac{\partial z}{\partial y}$ at (x_0, y_0, z_0) when $z(x, y)$ is given implicitly by $F(x, y, z) = 0$.

3. Section 14.3: Study the definition of differentiability for functions of two or more variables in section 14.3. Study the relation of differentiability with "the tangent plan" (which is the same as "the linear approximation" (section 14.6)) and why "existence of partial derivatives at a point" does not imply "differentiability at a point". Does this contradict Theorem 3?

4. Section 14.3: Study why differentiability at a point implies continuity at that point (study the proof of Theorem 4). Try to find a function of two variables that is continuous at a point but not differentiable at that point.

5. Section 14.3: You are welcome read the proofs of Theorem 2 and Theorem 3 in Appendix 9 for your own interest. They will not appear in any exam in this course.