Guide to Midterm Exam 2

1. Review all your homework problems in hw06-07 through hw11 and quizzes. As usual, the midterm will be more difficult than quiz problems. You practice and familiarity on the homework problems is basis for the midterm exam.

2. Memorize the transformation formula among Cartesian, cylindrical and coordinate systems in 3D.

3. Understand the meaning of continuity for function of two variables and its connection with functions which are only continuous (as functions of one variable) on any curve in the two-dimensional domain.

4. Understand the meaning of differentiable functions of two or more variables.

5. Study the relation between the linearization and directional derivatives of a differentiable function of two or more variables.

6. Understand the intrinsic meaning of gradient vectors and its relation with the level set (level curves, level surfaces) of a function.

7. Reiview the chain rule for funciton of two or more varibles. Study the Taylor expansion for function of two or more variables.

8. Study how to determine whether a critical point is a local min, local max or saddle point, both from discriminant test and from gradient analysis.

9. Study all about Lagrangian multipliers.

10. Study how to interchange order of integration in double and triple integrals when the domain is not just a rectangular or a cuboid.

11. Understand the meaning of the extra factor in double/triple integrations in polar, cylindrical and spherical coordinates.