References are to Stewart’s *Multivariable Calculus*, 8th edition. This assignment is not to be turned in.

The second exam will cover material from **Section 14.4** through **Section 15.10**. There will be no content from Chapter 16 on the exam.

Here’s a list of the skills to practice for the exam.

1. Find the equation of a plane tangent to the graph of a function. (14.4, #3,4,5,42)
2. Use differentials to estimate small changes in functions of multiple variables. (14.4, #33,35,39,41)
3. Use the chain rule to differentiate a function of one variable which depends on that variable via multiple intermediate functions. (14.5, #4,5,23,45)
4. Find the directional derivative of a function at a point in a given direction, and find the direction of maximum increase of a function at a point. (14.6 #1,5,18,21,29,36)
5. Determine when the extreme value theorem applies, and find the maximum and minimum values of a function on domain. (14.7, #33,33,37,40)
6. Apply the second derivative test to classify local extrema of functions of two variables. (14.7, #1,2,13,17)
7. Use the method of Lagrange multipliers to solve a constrained optimization problem. (14.8, #3,11,15,30)
8. Approximate the integral of a function of two variables using a Riemann sum. (15.1, #2,6,7)
9. Find the integral of a function of two variables over a region in the plane by setting up and computing an iterated integral. (15.2, #1,17,19)
10. Compute an iterated integral by reversing the order of integration. (15.2, #51,52,53)
11. Compute a double integral by setting up an iterated integral in polar coordinates. (15.3, #1,2,15,19)
12. Find the mass, center of mass, or moment of inertia about a given axis of a lamina or solid given its density function. (15.4, #1,3,14,19)
13. Find the probability of an event given a probability density function. (15.4, #29(a),(b))
14. Find the surface area of the graph of a function of two variables over a region in the plane. (15.5, #1,12,16(a),23)
15. Integrate over a 3D region using an iterated integral in Cartesian coordinates. (15.6, #11,13,29,34)
16. Integrate over a 3D region using an iterated integral in cylindrical coordinates. (15.7, #17,19,21,23)
17. Integrate over a 3D region using an iterated integral in spherical coordinates. (15.8, #29,31,34)
18. Integrate over funky shaped 2D regions by applying a change of coordinates. (15.9, #17,25,21,27)