

Study guide for Midterm Exam 02

1. Review [guide_mse22s_mid01.pdf](#), [guide_mse22s_quiz04.pdf](#), [guide_mse22s_quiz05.pdf](#) and [guide_mse22s_quiz06.pdf](#).
2. Section 14.7: Review the gradient analysis that helps to classify the critical points when the second derivative test is inconclusive, and how it can be applied to find absolute max and absolute min on a bounded region.
3. Section 14.8: Review all cases for the method of the Lagrangian multipliers. For example, extreme values of
 - functions of 2 variables, with 1 constraint.
 - functions of 3 variables, with 1 constraint.
 - functions of 3 variables, with 2 constraints.
4. Section 14.9: Review the derivation of Taylor's formula for functions of two or more variables. Memorize the results.
5. Section 14.10: Review partial derivatives with constrained variables. In particular, study how to identify the independent variables and dependent variables from the all the variables and the number of equations/constraints.
6. Section 15.1, 15.2: Study how to identify the limits of integration in $\int_c^d \int_{h_1(y)}^{h_2(y)} f(x, y) \, dx dy$ and $\int_a^b \int_{g_1(x)}^{g_2(x)} f(x, y) \, dy dx$ for general domains (that is, not rectangles).
7. Section 15.2, 15.3: Study how to interchange between $\int_c^d \int_{h_1(y)}^{h_2(y)} f(x, y) \, dx dy$ and $\int_a^b \int_{g_1(x)}^{g_2(x)} f(x, y) \, dy dx$ for general domains as in problems 33-56 of section 15.2.