Homework Assignment for Week 11

1. Section 14.10: Problems 3, 7, 9, 12.

2. Section 14.10: Follow up on problem 12: Give a formula for $\left(\frac{\partial u}{\partial x}\right)_y$ where $u = U(x, y, z, w)$ with the constraint $f(x, y, z, w) = 0$ and $g(x, y, z, w) = 0$.

   Hint: count the numbers of dependent and independent variables first.

3. Section 14.10: Follow up on problem 23 of Section 14.8. It is known that the minimum and maximum occurred at $P_1 = (1, -2, 5)$ and $P_2 = (-1, 2, -5)$, respectively. Show that the partial derivatives with constrained variables $\left(\frac{\partial f}{\partial x}\right)_y$ and $\left(\frac{\partial f}{\partial y}\right)_x$ are both zero at P_1 and P_2.

4. Section 15.1: Problems 21, 33, 36.

5. Section 15.2: Problems 11, 19, 29, 35, 43, 47, 69.

6. Section 15.3: Problems 13, 17.

Midterm exam 2 covers up to section 15.3.