Homework II First-Half

Due in class Monday July 16 2017

1. The utility function is $u(x, y) = Ax^a y^b$. The unit price of x is p dollars and the unit price for y is q dollars. Find x and y to maximize the utility subject to m dollars budget constraint.

2. $u(x, y)$ is a utility function, and $g(x, y)$ is the budget function. When the budget is 200, it is known the maximal utility is 125. If we know at this point the Lagrange multiplier is $\lambda = 3$, estimate the maximal utility when the budget is 198

3. Minimize $f(x, y, z) = x^2 + y^2 + z^2$ subject to the constraint $x + y + z = 1$.

4. Minimize $f(x, y, z) = x^2 + y^2 + z^2$ subject to the constraints $x + y + z = 1$ and $x - y + z = 3$

5. There is a string of length L. Mickey cuts the string into two segments, of length x and y respectively. He uses the length x segment to make a square and the length y segment to make a circle. Find (x, y) that minimizes the total area enclosed by the square and the circle.