Math Review

10. Optimization practice questions

Practice Questions

1.

Given the utility function $U(x, y) = x + \log y$, answer the following questions:

a. Given prices p_x and p_y and wealth w, derive the demands for x and y.

In other words, find x and y that maximizes $U(x, y)$ subject to the constraint $w = xp_x + yp_y$

2. Given that utilities for person A and person B are given by:

$$U_A(h_A, y) = y - h_A^2 \quad \text{and} \quad U_B(h_B, y) = y - \frac{h_B^2}{2},$$

Where $y = h_A + h_B$

Maximize, social welfare (W) which is defined as $W = U_A + U_B$

3. You have the following utilities for 2 people:

$$U_1(x_1, y_1) = \ln x_1 + 3 \ln y_1 \qquad \text{and} \qquad U_2(x_2, y_2) = 3 \ln x_2 + \ln y_2.$$

Given that, $x_1 + x_2 = 4$ *and* $y_1 + y_2 = 4$

Maximize U1 subject to U2.

You answer should provide y as a function of x.