



B.E. International Program

Faculty of Economics, Thammasat University



EE 320 Introductory Mathematical Economics (Section 046402)

Semester 1/2013

Quiz 6 (a)

Given the utility maximization problem

$$\max_{x,y} U(x,y) = xy + x + 2y$$

Subject to

$$2x + 5y = 51$$

1. (6 point) Form the Lagrangian function. Then, find the stationary points and the corresponding utility level.

Ans.

$$\mathcal{L}(x, y, \lambda) = xy + x + 2y + \lambda[51 - 2x - 5y]$$

FONC:

$$\mathcal{L}_x = y + 1 - 2\lambda = 0$$

$$\mathcal{L}_y = x + 2 - 5\lambda = 0$$

$$\mathcal{L}_\lambda = 51 - 2x - 5y = 0$$

$$\Rightarrow (x^*, y^*) = (13, 5) \text{ and } U^* = 88$$

2. (4 points) Write down the bordered Hessian matrix, and verify that the second-order sufficient condition is met.

Ans.

$$|\bar{H}| = \begin{vmatrix} 0 & 2 & 5 \\ 2 & 0 & 1 \\ 5 & 1 & 0 \end{vmatrix} = 20 > 0$$