Economics 202
Dr. Smith

Name: Key

Pledge: _____

Quiz 2

Instructions:

- You may not consult any outside materials. You may not consult with your classmates.
- You **may** use a calculator.
- You have twenty-five minutes to complete the quiz.
- **You must show your work in order to receive full credit!**

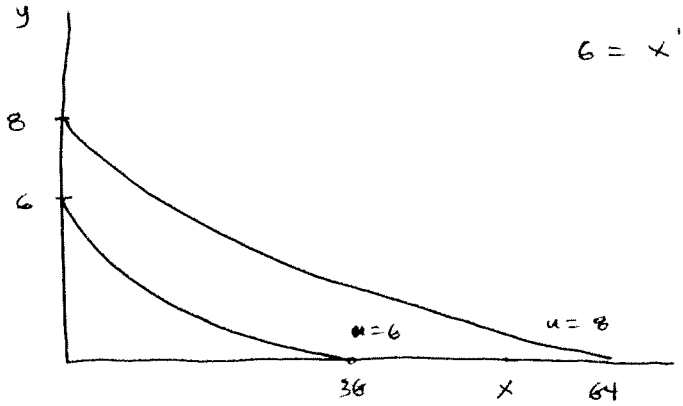
1. (12 points) Sam has the following utility function:

$$U(x,y) = x^{1/2} + y$$

   a. Please graph the indifference curves for the utility levels 6 and 8.
   b. Find the expressions for the marginal utility of x and the marginal utility of y.
   c. Find the expression for the marginal rate of substitution.
   d. Does this utility function display the property of monotonicity?

2. (8 points) Use LaGrange's method to find Sam's optimal bundle. Good x (hamburgers) is \$5, and good y (sweet potato fries) is \$4. Sam has \$60 per month to spend on burgers and sweet potato fries, and Sam's preferences are represented by the following utility function:

$$U(x,y) = x^2 y$$



$6 = x^{1/2} + y$

$MU_x = \frac{1}{2} x^{-1/2}$

$MU_y = 1$

$MRS = \frac{\frac{1}{2} x^{-1/2}}{1} = \frac{1}{2\sqrt{x}}$

$\mathcal{L} = x^2 y - \lambda(5x + 4y - 60)$

$\begin{cases} \mathcal{L}_x = 2xy - 5\lambda = 0 \\ \mathcal{L}_y = x^2 - 4\lambda = 0 \\ \mathcal{L}_\lambda = -(5x + 4y - 60) = 0 \end{cases}$

$\frac{2xy}{5} = \frac{x^2}{4}$

(1) $\frac{2y}{x} = \frac{5}{4}$

(2) $5x + 4y = 60$

(1) → (2)

$5x + 4\left(x\frac{5}{8}\right) = 60$

$7.5x = 60$

$x^* = 8$

$y^* = 5$