

# MICROECONOMIC THEORY I

## PROBLEM SET 2

DUE DATE: FRIDAY, SEPTEMBER 20 BY 5:00PM  
(SLIDE UNDER MY OFFICE DOOR)

**Instructions:** Clearly identify your solution (e.g., circle your answer) so that I can quickly identify your answer. Print your entire name at the top left of every page. I will not accept late assignments. See syllabus for grading scheme. Staple or paperclips your answers to this handout, and be neat.

Use each of the utility functions below to answer the following questions. Always assume  $x, y > 0$ :

(a)  $U = f(x, y) = x^{\frac{1}{4}}y^{\frac{3}{4}}$

(b)  $U = f(x, y) = x^{\frac{1}{2}} + y^{\frac{1}{2}}$

(c)  $U = f(x, y) = y - x^{-1}$

1. Derive the marginal rate of substitution ( $MRS_{y,x}$ ) functions. Is MRS diminishing? Does each of these three utility functions represent unique preferences? Why or why not?
2. Derive the uncompensated (Marshallian) demand functions for  $x(P_x, P_y, I)$  and  $y(P_x, P_y, I)$ .<sup>1</sup>
3. Are the goods normal or inferior? Verify your answer.
4. Derive the indirect utility function,  $V(P_x, P_y, I)$ .

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<sup>1</sup> $P_x$  and  $P_y$  are the market prices of good  $x$  and  $y$ , and  $I$  is exogenous consumer income. Assume all prices and income are non-negative.