EconS 301- Intermediate Microeconomic Theory
Homework #2 - Due date: Tuesday February 10th, 2026.

1. Fran has utility function $u(x, y) = x^2 y^{1/2}$, facing prices $p_x = \$5$ and $p_y = \$3$, and income $I = \$30$. Using the same steps as in example 3.2 (Chapter 3, page 52), find Fran's optimal consumption of goods x and y.

2. John's utility function is $u(x, y) = 6x + 8y$ and faces prices $p_x = \$2$ and $p_y = \$3$ and income $I = \$25$. Comparing his $MRS_{x,y}$ and the price ratio, find his optimal consumption of goods x and y.

3. Felix's utility function is $u(x, y) = 5\min\{4x, 6y\}$ and he faces prices $p_x = \$1$ and $p_y = \$2$ and income $I = \$120$. Find his optimal consumption of goods x and y.

4. Brandon has a weekly income of $I = \$40$ that he allocates between purchasing goods x and y. When the price of good x is \$4 and the price of good y is \$4, Brandon purchases 3 units of good x and 7 units of good y in equilibrium. Suppose now that the price of good x falls to \$2.

   (a) Find the equation of his original and new budget lines, and represent it graphically.

   (b) Suppose that Brandon's new equilibrium bundle is 5 units of good x and 5 units of good y. Does this new bundle violate WARP? Explain why or why not.

   (c) Suppose now that Brandon's new equilibrium bundle contained 4 units of good y. How many units of good x must be consumed such that our equilibrium allocation does not violate WARP?

5. Carter wishes to reach a utility level of $U = 70$ and has a quasilinear utility function of the type $u(x, y) = 2x + y^{1/2}$. The price of good x is \$4 while the price of good y is \$1.

   (a) Find Carter's tangency condition following step 1 of the expenditure minimization procedure.

   (b) Find Carter's equilibrium quantities for goods x and y.

   (c) How much income does Carter require to reach his target utility level?

6. John's utility function is $u(x, y) = 3x + 4y^{1/2}$, his income is $I = \$220$, and $p_y = \$1$. The price of good x decreases from $p_x = \$3$ to $p'_x = \$2$. Find the substitution and income effect from this price change.