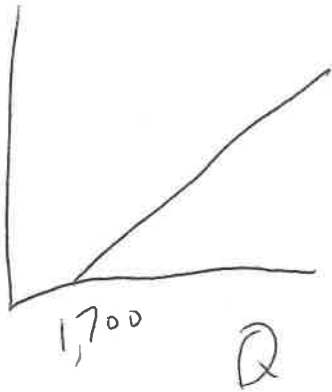


ANSWERS

Use answer the following questions briefly but completely.

Supply curve in the market for electricians in Fairfield County if it is given by $Q_s = 1,700 + 15W$, where Q_s and W = market wage. If the wage is \$50, CALCULATE the price elasticity of supply.



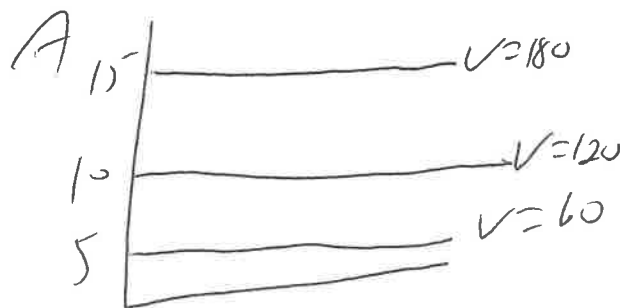
$$Q_s(50) = 2,450$$

$$PES = \frac{P}{Q} \frac{\Delta Q}{\Delta P}$$

$$= \frac{50}{2450} (15)$$

$$= .306$$

2. Suppose Sue has a market basket containing 7 Apples and 6 Bananas. Her utility function is given by $U = 12A$, where A = # apples she consumes. What is her utility level at 5 apples and 5 bananas? DRAW three of her indifference curves in the space below plotting points for each.



$$5A, 5B$$

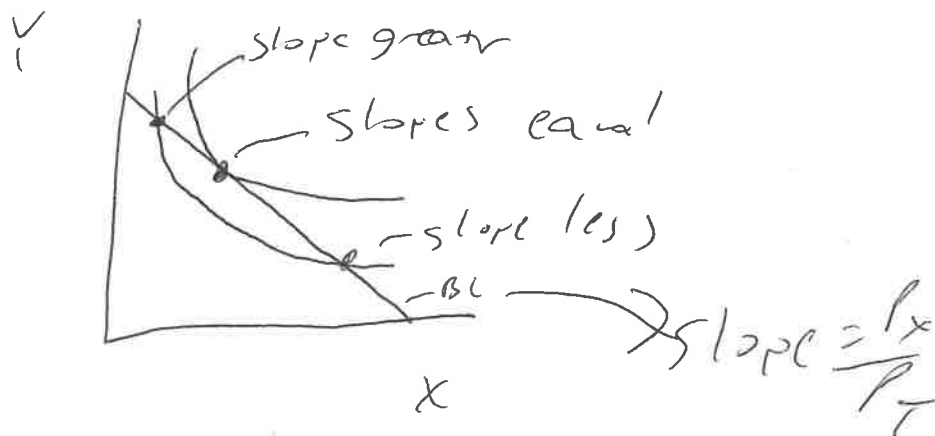
$$U = 12(5)$$

$$= 60$$

B

3. TRUE/FALSE/UNCERTAIN: "If the marginal rate of substitution is greater than the price ratio, the consumer is maximizing utility." EXPLAIN using a diagram.

False $MRS = \frac{MU_x}{MU_y}$ ~ slope of indiff. curve



II. **SHORT ANSWER** – Please answer all parts of the following questions as carefully as you can in the time available. Please remember to label your diagrams.

1.) In the market for beers on a Tuesday night at the local bar, demand is represented by $Q_d = 40 - 5.25P$ and supply is $Q_s = 10 + .75P$.

a.) Find the equilibrium.

$$40 - 5.25P = 10 + .75P$$
$$6P = 30$$
$$P = 5$$
$$Q = 13.75$$

b.) Find the price elasticity of demand and supply at that equilibrium.

$$PE_D = \frac{5}{13.75} \cdot (-5.25) = -1.91$$
$$PE_S = \frac{5}{13.75} (.75) = .273$$

c.) What is the elasticity of demand if price were \$3? What's the elasticity of supply at $p = \$3$? What do those numbers mean for consumers and firms?

$$PE_D = \frac{3}{24.25} = .124$$
$$PE_S = \frac{3}{12.25} = .245$$

Both are inelastic. Consumers only respond with a .124% change in Q_d to 1% change in price. Suppliers barely respond.

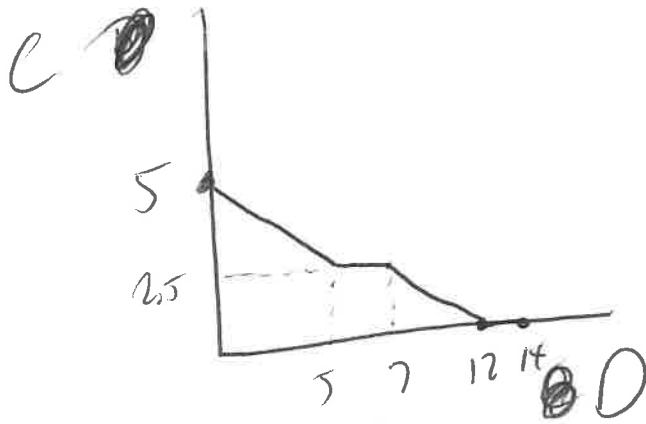
2.) Suppose Homer spends \$16 per week on Donuts and Coffee. Donuts are \$2 and coffee is \$4 in the first scenario (I.) and \$.50 and \$2 in the second (II.).

a. WRITE the equations for budget constraints I and II in the diagram below.

I. $2D + 4C = 16$

II. $.50D + 2C = 16$

- b. Suppose that Homer currently has \$10 to spend, and the price of Donuts is \$1 and the price of coffee is \$2. He joins a "Donut Club" that awards him 2 free donuts for every 5 donuts he purchases. SHOW his new budget constraint. CAREFULLY LABEL your axes and EXPLAIN your new constraint.



3. Ania consumes goods X and Y. Her utility function is given by $U(X,Y) = 50X + 5Y$.

- a. Find the marginal utility of X and Y. PLOT indifference curves for Ania for $U = 500$ and $U = 1500$.

$$MU_X = 50$$

$$MU_Y = 5$$

$$U = 500$$

$$X = 0 \quad Y = 100$$

$$X = 5 \quad Y = 50$$

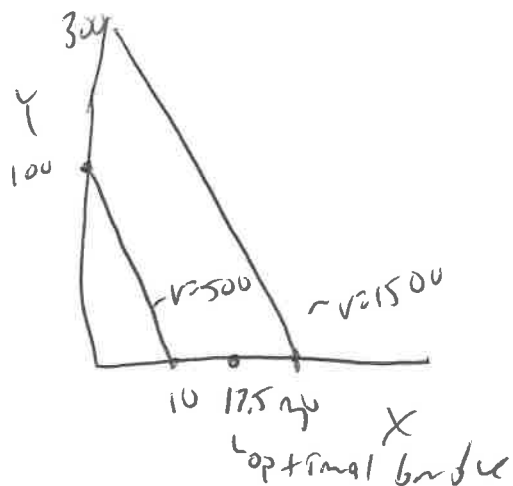
$$X = 10 \quad Y = 0$$

$$U = 1500$$

$$X = 0 \quad Y = 300$$

$$X = 10 \quad Y = 200$$

$$X = 30 \quad Y = 0$$



- b. FIND the optimal quantity of X and Y for Ania if she has \$70,000 to spend and $P_x = \$4000$ and $P_y = \$1000$. SHOW this solution in your diagram above. EXPLAIN why this is optimal for Ania.

2 Corner solution
All X,

$$\frac{MU_x}{MU_y} = \frac{10}{1} \neq \frac{P_x}{P_y} = \frac{4}{1}$$

III. **PROBLEM SOLVING** – Please answer all parts of the following problem as carefully as you can in the time available. Please show all of your work.

Consider Don, a college student at Fairfield who has \$2,000 this semester to spend on Books and Food. The Price of Books (on average) is \$125 and the Price of Food is \$20 per unit. Don's utility function is given by:

$$U(B,F) = 5B^{0.80}F^{0.20}$$

where B = # books purchased and F = # units of food purchased in the semester.

- a. What is Don's marginal utility of books? Marginal utility of food? What is the marginal rate of substitution. (Hint: use the exact same derivative rules you have before, nothing changes with these exponents.)

5

$$MU_B = 4B^{-.2} F^{.2}$$

$$MU_F = B^{.8} F^{-.8}$$

$$MRS = \frac{4B^{-.2} F^{.2}}{B^{.8} F^{-.8}}$$

$$= \frac{4F}{B}$$

- b. CALCULATE the optimal quantity of Books and Food for Don. SHOW this solution using a diagram.

$$\frac{4F}{B} = \frac{125}{20}$$

$$8F = 125B$$

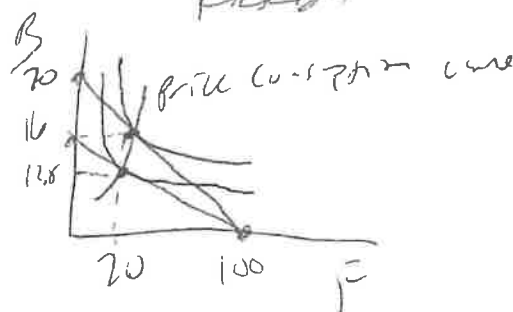
$$F = 1.5625B$$

$$125B + 20F = 2000$$

$$125B + 20(1.5625B) = 2000$$

$$B = 12.8$$

$$F = 20$$



- c. Suppose President Nemec sets a **\$100 price ceiling** on the price of textbooks. **CALCULATE** the new optimal quantity of Books and Food for Don this semester. **SHOW** this optimal bundle in your diagram above.

5

$$\frac{4F}{B} = \frac{100}{20}$$

$$5B = 4F$$

$$F = \frac{5}{4}B$$

B=16, F=20

- d. **SHOW** your price consumption curve in your diagram above.

3

- e. Use the information above to plot **2 points** on **Don's demand curve** for Books in a diagram below.

