

Problem Set #3
 PPA 897
 Professor John McPeak
 Due _____

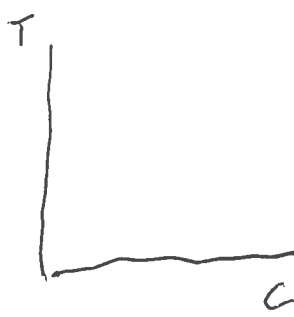
Name KEY

1) I know the price of coffee is \$1.00 per unit and the price of Tylenol is \$.50 per unit (for our graduate student consumer, this is all they consume!). I also know that the consumer is currently purchasing 4 units of coffee and 6 units of Tylenol. I also know that the marginal utility of coffee at a bundle the consumer is buying is 1 the marginal utility of Tylenol is 3. The graduate student has an income of \$7.00 per day.

a. Describe how we know the bundle in question lies on the budget line (rather than below the budget line in the opportunity set or above the budget line).

$$\begin{aligned}
 P_C &= \$1.00 & P_C \cdot C + P_T \cdot T &= \$7.00 \\
 P_T &= \$0.50 & 1 \cdot 4 + .50 \cdot 6 &= 7 \\
 C &= 4 & 4 + 3 &= 7 \\
 T &= 6 & & \\
 MU_C &= 1 & & \\
 MU_T &= 3 & &
 \end{aligned}$$

b. Explain why the point where the consumer has the marginal utilities described above is not the optimal bundle.

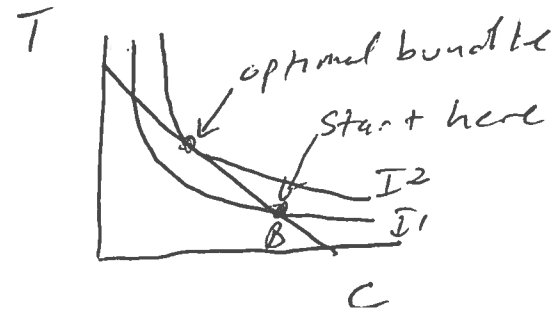


$$\begin{aligned}
 \text{MRS} & & \text{or} & \\
 -\frac{MU_C}{MU_T} &= -\frac{1}{3} & \frac{MU_C}{P_C} &= \frac{1}{1} = 1 \\
 \text{MRT} & & \frac{MU_T}{P_T} &= \frac{3}{.5} = 6 \\
 -\frac{P_T}{P_C} &= -\frac{.50}{1.00} = -\frac{1}{2} & &
 \end{aligned}$$

c. Is the optimal bundle going to be composed of more coffee and less Tylenol or less coffee and more Tylenol than the consumption bundle the consumer is currently at? Why?

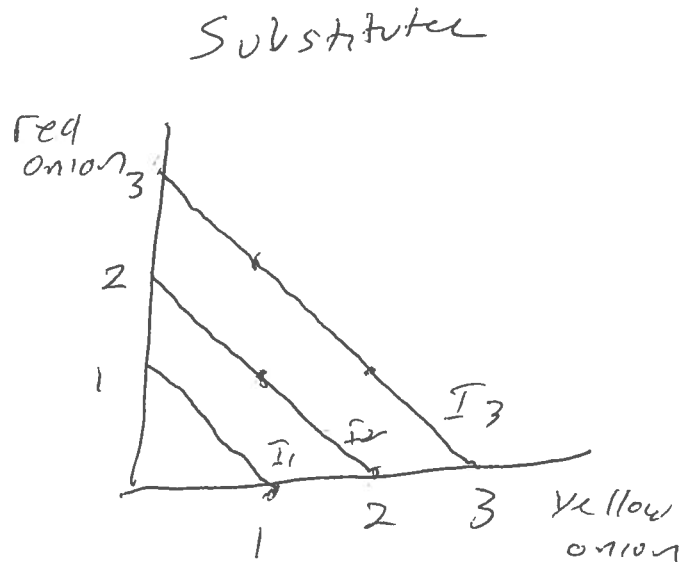
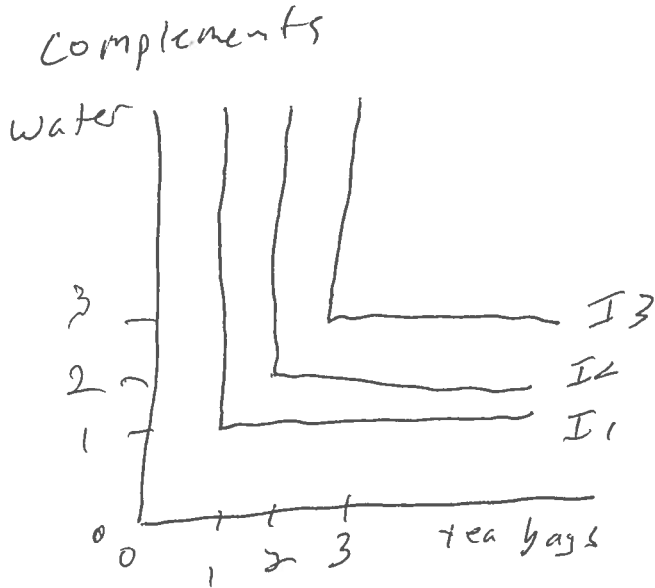
more tylenol, less coffee.
 (1) MRS is less steep than MRT or (2) MU per dollar is higher from T compared to C

d. Show on graph that illustrates indifference curves and budget constraints where the consumption bundle described in the introduction to this problem lies in relation to the optimal bundle.



2) Indifference curves.

- a. Draw an indifference curve where the two goods in questions are perfect complements, and then draw one where the two goods in question are perfect substitutes. Provide examples of the goods in each scenario (make up a story).



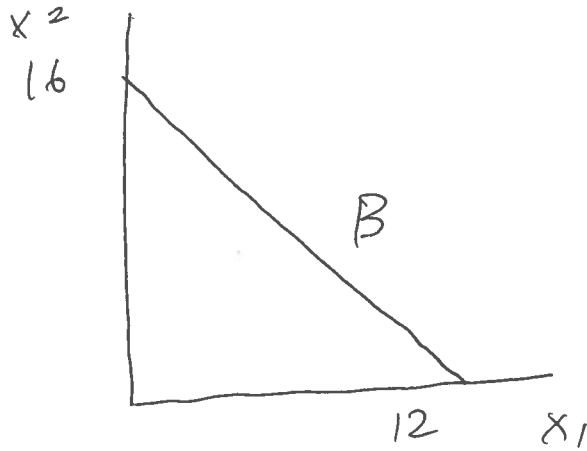
- b. Is the shape of indifference curves influenced by changes in market prices? Why or why not.

No. It is based on preferences of a consumer. Market prices influence the budget line, not the indifference curves.

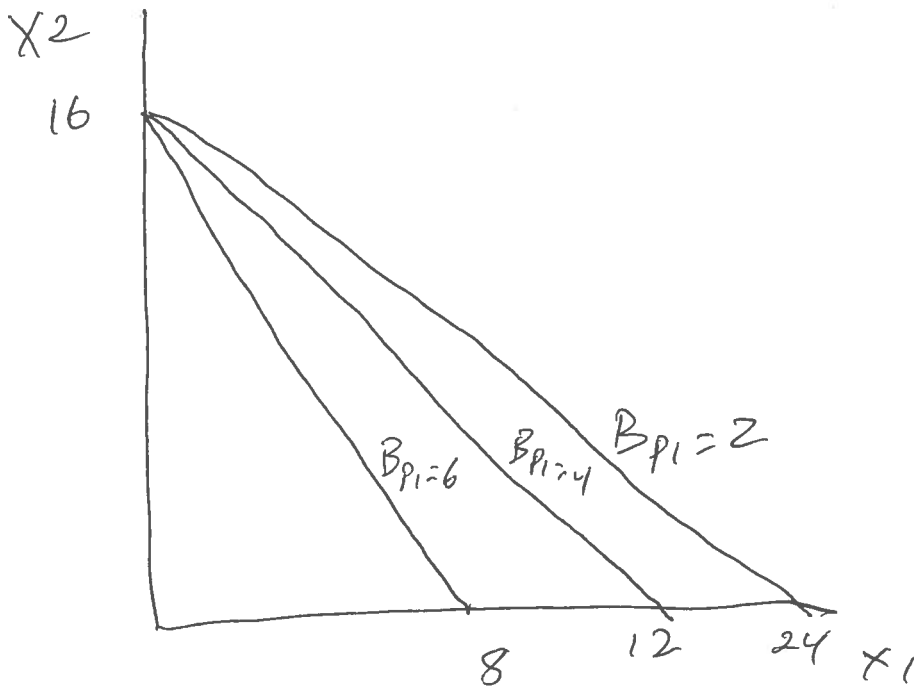
- c. Why can't indifference curves cross?

It leads to an outcome that is not logical since it leads to a contradiction between the ideas of more is better than less and transitivity of preferences.

- 3) If $p_1 = 4$, $p_2 = 3$, and $Y = 48$
a. Draw the budget constraint.

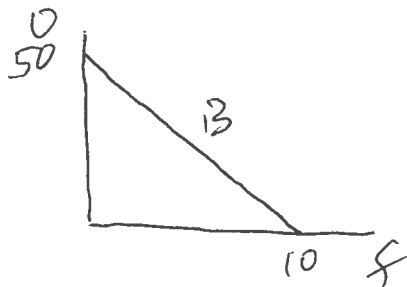


- b. Draw the budget line if the price of good one changes to $p_1 = 2$ all else constant, and then to $p_1 = 6$ all else constant.

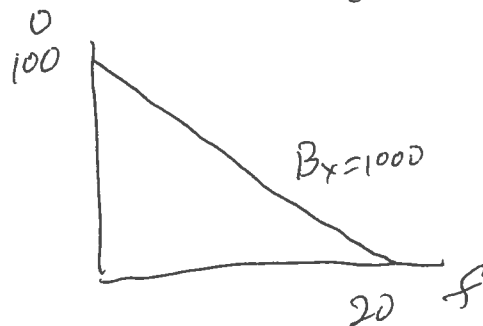


4) The price of food is \$50 per unit, the price of all other goods is \$10 per unit, and the consumer's income is \$500.

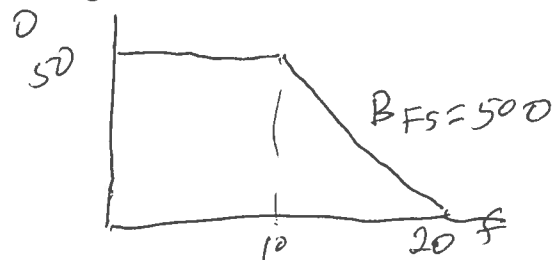
a. Draw the consumer's budget constraint.



b. If the consumer's income changes to \$1000 by being given a cash grant of \$500, draw the new budget constraint.

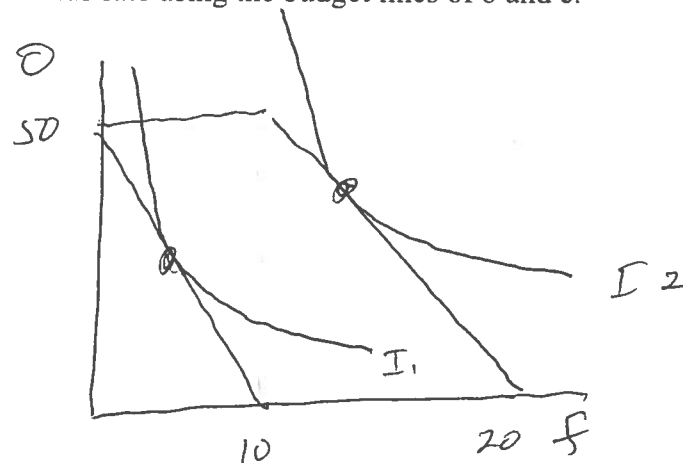


c. If the consumer from the original problem (with an income of \$500) is given \$500 in food stamps rather than a cash grant of \$500, draw the new budget constraint.



d. Show an example of an indifference curve where the consumer is made equally well off by either a cash transfer or a food stamp program.

Illustrate using the budget lines of b and c.



5) Say that you know for a particular consumer and particular consumption bundle the marginal utility of consuming eggs is 10 and the marginal utility of consuming bacon is 15.

- a. The negative of the ratio of these marginal utilities defines the slope of what curve?
 $MU_e = 10$ The Marginal Rate of Substitution
 $MU_b = 15$ (MRS)

This is the slope of the indifference curve

- b. If the price of a unit of eggs is 4, the price of a unit of bacon is 3, and the consumption bundle defined above is on the budget line, why is the consumption bundle identified above not an optimal bundle?

$P_e = \$4.00$

$P_b = \$3.00$

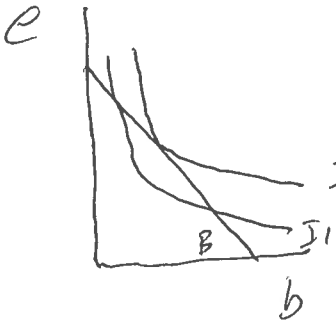
$MRS = \frac{-15}{10} = -\frac{3}{2} = -1.5$

$MRT = \frac{-3}{4} = -0.75$

$MRS \neq MRT$

or $\frac{MU_b}{P_b} = \frac{15}{3} = 5$

$\frac{MU_e}{P_e} = \frac{10}{4} = 2\frac{1}{2}$



- c. Should we increase egg consumption and decrease bacon consumption, increase bacon consumption and decrease egg consumption, increase both, or decrease both to arrive at the optimal bundle? Illustrate your reasoning on a graph or graphs.

