ECO 401-002 Problem Set #2 KEY Spring 2016

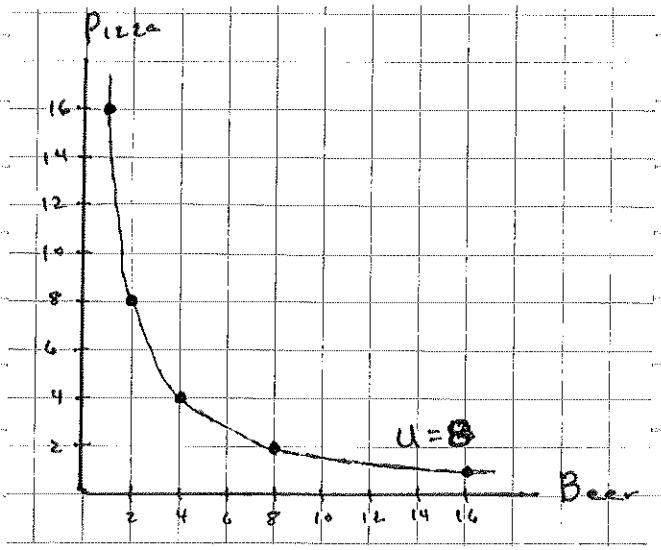
(4pts.) 1. $U = 2B^{1/2}P^{1/2}$

if $B = 4$ and $P = 4$ then $U = 2(4)^{1/2}(4)^{1/2} = \underline{8}$

other points on the $U = 8$ indifference curve:

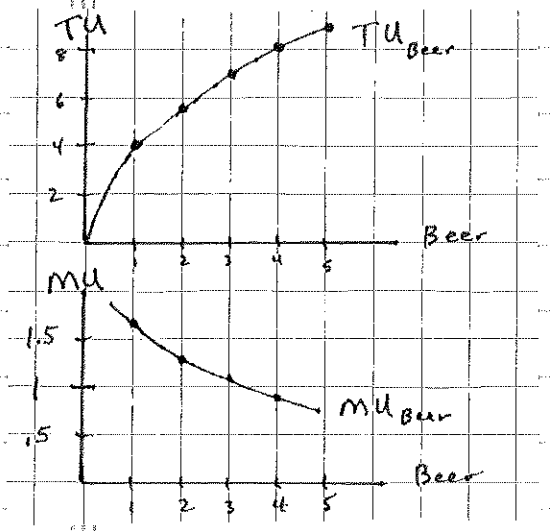
$2B^{1/2}P^{1/2} = 8$, $B^{1/2}P^{1/2} = 4$, or $B \cdot P = 16$

so the following combinations of beer and pizza yield total utility of 8: (16, 1), (8, 2), (4, 4), (2, 8), (1, 16)




(4 pts.) 2. $MU_B = \frac{dU}{dB} = \frac{1}{2}(2)B^{-1/2}P^{1/2} = P^{1/2}/B^{1/2}$

if $P = 4$, then $MU_B = \frac{2}{\sqrt{B}}$

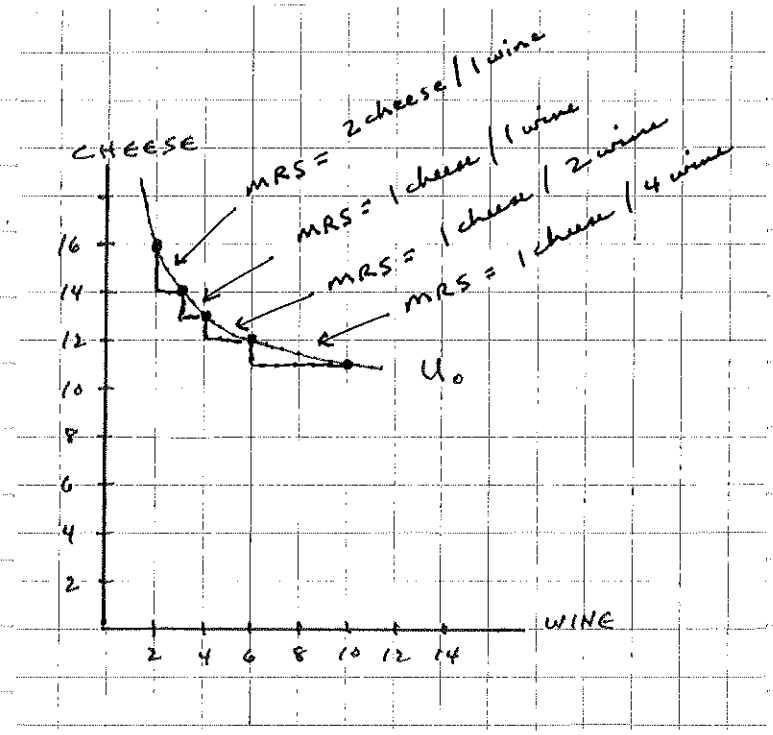



alternatively, if $P = 4$ and

| | | $MU_B$ |
|---|---|---|
| $B = 1$, $U = 4$ | | |
| | } | 1.66 |
| $B = 2$, $U = 5.66$ | | |
| | } | 1.27 |
| $B = 3$, $U = 6.93$ | | |
| | } | 1.07 |
| $B = 4$, $U = 8$ | | |
| | } | .94 |
| $B = 5$, $U = 8.94$ | | |

The marginal utility of beer is always positive, so Adam will drink an infinite amount if beer is free!?!

(4 pts.) 3.



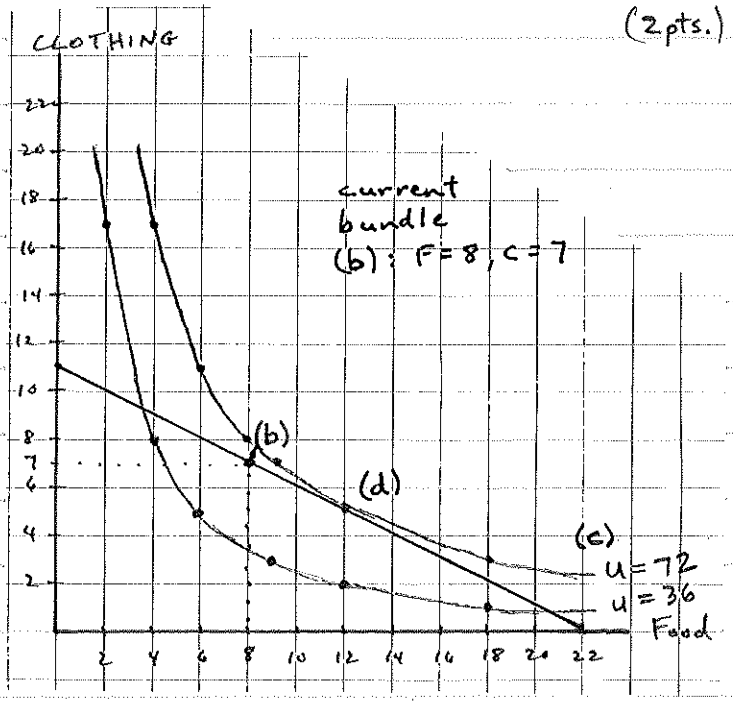

(13 pts.) 4. $U = FC + F$ . $MU_F = C + 1$ , $MU_C = F$

$P_F = \$1$ , $P_C = \$2$ , $I = \$22$

(1 pt.) (a) $P_F \cdot F + P_C \cdot C = I$

if $F = 8$ , then $P_C \cdot C = I - P_F \cdot F$ , and $C = 7$

(2 pts.) (b)




(2 pts.) (c) $U = FC + F = 36$

$F(C+1) = 36$

| F | C |
|---|---|
| 2 | 17 |
| 4 | 8 |
| 6 | 5 |
| 9 | 3 |
| 12 | 2 |
| 18 | 1 |

$U = F(C+1) = 72$

| F | C |
|---|---|
| 4 | 17 |
| 6 | 11 |
| 8 | 8 |
| 9 | 7 |
| 12 | 5 |
| 18 | 3 |

(1 pt.) (d) tangency of IC to budget constraint occurs at $F = 12$ and $C = 5$ and $U = 72$

(3 pts.) (e) If consumer is maximizing utility, then they are choosing a bundle of food and clothing such that their indifference curve is tangent to the budget constraint, i.e.,:

$$MRS_{F,C} = \frac{MU_F}{MU_C} = \frac{P_F}{P_C}$$

and also that the consumer is spending their their entire income:

$$P_F \cdot F + P_C \cdot C = I$$

so we have 2 equations and 2 unknowns:

$$\frac{C+1}{F} = \frac{1}{2} \quad \text{and} \quad 1 \cdot F + 2 \cdot C = 22$$

$$F = 22 - 2C$$

and then $\frac{C+1}{22-2C} = \frac{1}{2}$

$$C + 1 = \frac{1}{2}(22 - 2C) = 11 - C$$

$$2C = 10, \quad C = 5, \quad \text{and} \quad F = 12$$

which is the same as (d)

(2 pts.) (f) $MRS_{F,C} = \frac{MU_F}{MU_C} = \frac{C+1}{F} = \frac{6}{12} = \frac{1}{2}$, which is the slope of the budget line in the diagram.

(2 pts.) (g) $MRS_{F,C} = \frac{C+1}{F}$. Pick any 2 points on either the $U = 36$ or $U = 72$ IC's and plug in. MRS declines. Graphically, the IC's are convex to the origin.