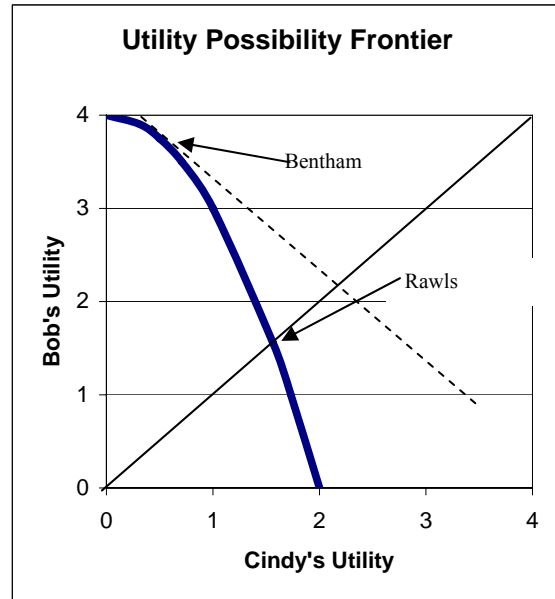


Ch4: Answers to some Problems

#1a, page 178:

X <sub>c</sub>	X <sub>r</sub>	U <sub>c</sub>	U <sub>r</sub>	U <sub>c</sub> +U <sub>r</sub>
0	4	0	4	4
0.1	3.9	0.32	3.90	4.22
<b>0.25</b>	<b>3.75</b>	<b>0.50</b>	<b>3.75</b>	<b>4.25</b>
0.5	3.5	0.71	3.50	4.21
1	3	1.00	3.00	4.00
<b>2.44</b>	<b>1.56</b>	<b>1.56</b>	<b>1.56</b>	<b>3.12</b>
3	1	1.73	1.00	2.73
4	0	2.00	0.00	2.00



1b: To maximize  $U_{\Sigma}(X_c) = X_c^{1/2} + 4 - X_c$  we set the derivative equal to zero:

$$\frac{dU_{\Sigma}(X_c)}{dX_c} = 0.5X_c^{-1/2} - 1 = 0$$

$$X_c^{-1/2} = 2 \text{ or } X_c = 1/4.$$

If  $X = 6$ , we have  $U_{\Sigma}(X_c) = X_c^{1/2} + 6 - X_c$ , and again we have  $X_c = 1/4$ !

Why doesn't Cindy get more? In general, maximization of the sum of their utilities requires that  $dU/dX_c = dU_r/dX_r$ , and we have  $dU_r/dX_r = 1$  for all  $X_r$ ; therefore, we must have  $dU/dX_c = 1$  also, but that requires  $X_c = 1/4$  for all  $X$ . If  $X = 1/4$ , Cindy gets it all, but she doesn't get more if there is more  $X$ !

1c.  $X_c = (6 - X_c)^2$ , which is satisfied for  $X_c = 4$ .

#5a, page 179:

Since  $X_2 = M/p_2 - p_1X_1/p_2$ , we obtain on substitution into the utility function

$$U^*(X_1) = 2X_1^{1/2} + M/p_2$$

$$dU^*/dX_1 = X_1^{-1/2} - p_1/p_2 = 0 \text{ or } X_1 = (p_2/p_1)$$

Caution Note: We cannot buy more than  $M/p_1$  of  $X_1$ ,

Question 11a: See Fig 4.15, p 154

Question 12: Graph like Fig 4.28, p 172 but with point a where the two indifference curves cross at the exact center of the graph (fair shares for all) and point e where those two indifference curves are tangent off center. All the points within the cigar shaped area formed by those two indifference curves are better for both individuals than the Fair Shares for All at point a.

8b: Let us reinterpret Figure 4.19, page 158. Suppose that the after tax wage was \$3.00 when a tax rate of \$2 was imposed. Our worker put in a 12 hour day. If the tax is reduced to \$2. a 10 hour day, enjoying both more leisure and a little more after tax income.

For more indifference curve graphs, click below and run the Power Point *Slide Show*

<http://mlovell.web.wesleyan.edu/E110/Ch4IndifferenceMaps.ppt>