Economics 100A: Microeconomic Analysis
Fall 2001

Problem Set 4
(Due the week of September 24)

Answers

1. An *inferior* good is defined as one of which an individual demands less when his or her income rises and more when his or her income falls. A *normal* good is defined as one of which an individual demands more when his or her income increases and less when his or her income falls. A *luxury* good is defined as one for which its demand increases by a greater proportion than income. A *necessary* is defined as one for which its demand increases by a lesser proportion than income.

   The same good can be both normal and inferior. For instance, a good can be normal up to some level of income beyond which it becomes inferior. Such a good would have a backward-bending Engel curve.

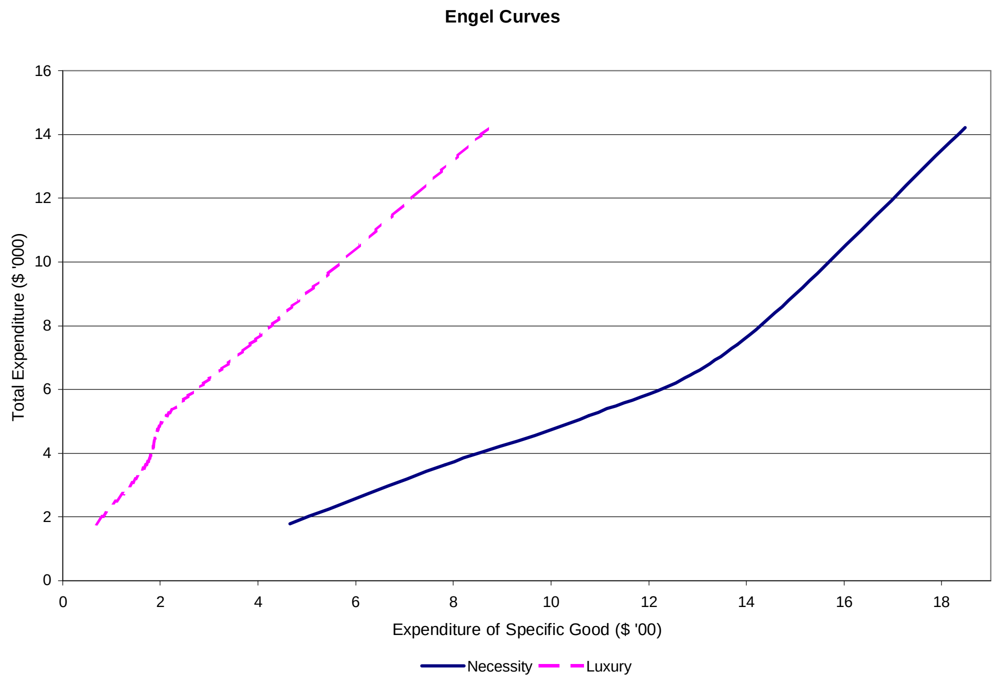
2.

   (a)

Table 2. Percentage Allocation of Family Budget

	Income Groups				
	A	B	C	D	E
Food Prepared at Home	26.1	21.5	20.8	18.6	13.0
Food Away from Home	3.8	4.7	4.1	5.2	6.1
Housing	35.1	30.0	29.2	**27.6**	**29.6**
Clothing	6.7	9.0	**9.8**	**11.2**	**12.3**
Transportation	7.8	14.3	**16.0**	**16.5**	**14.4**

(b) All of them.
(c) Food away from home, clothing and transportation.
(d) Food prepared at home and housing.
(e) The graph below depicts the Engel curve for food away from home (a luxury good).
(f) The graph below depicts the Engel curve for food prepared at home (a necessity good).
(g) The curve for a luxury gets flatter as income rises, while the curve for a necessity gets steeper.



3.

(a) We say that preferences are homothetic if U(x,y) > U(x',y') implies that U(tx,ty) > U(tx',ty'), for any positive value of t. U(x,y) = 5xy clearly satisfies this property since, if 5xy > 5x'y', then 5txty > 5tx'ty', for any positive t. Not all preferences need satisfy this property. The quasi-linear utiliy $U(x,y) = x + y^{0.5}$ gives an example of non-homothetic preferences. (Verify this.)

(b) Note that these are Cobb-Douglas preferences. For these preferences we know that the optimal choices are given by

$$x = \frac{1}{2}\frac{m}{p_x}$$

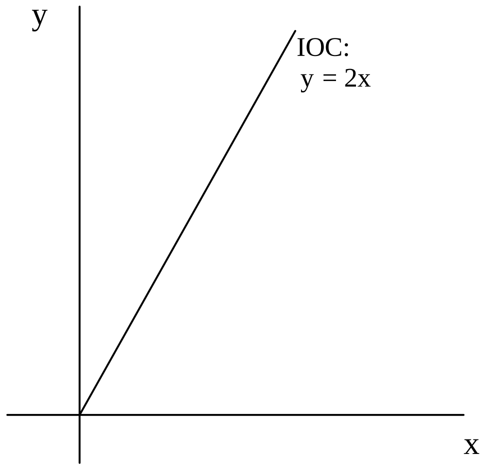
$$y = \frac{1}{2}\frac{m}{p_y}$$

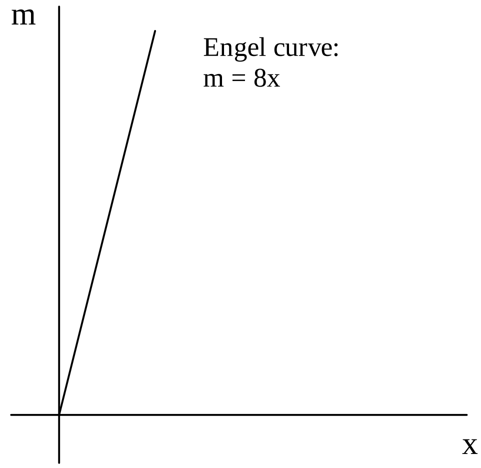
(See Varian, chapter 5, p. 82.) With m = $1200, p_x = $4 and p_y = $2, the optimal x and y are 150 and 300, respectively.

(c) The IOC gives the optimal (x,y) locus as m increases. We can derive the IOC from the optimal-choice equations of x and y in part (b). Combining these two equations we can get $p_x x = p_y y$. Thus, given p_x = $4 and p_y = $2, we can solve for y to get the IOC as the curve y = 2x.

(d) From the IOC we can see that both goods are normal goods: As income increases, that is, as we move away from the origin on the IOC, the quantities of x and y demanded increase.

(e) The Engel curve of x traces all the optimal values of x as m increases. We can derive this curve from the optimal-choice equation of x given in part (b). Thus, given p_x = $4, we can solve that equation for m to get the Engel curve as the curve m = 8x. This curve corresponds to the Engel curve of a normal good. Thus, x is normal, as we know from part (d).





4.

(a) Neville will buy 90 bottles.
(b) Neville would have to have 8400 pounds.
(c) Neville would buy 88 bottles.
(d) Neville would demand 70 bottles.
(e) The total price effect is to reduce Neville's demand of claret by 20 bottles (70-90). The substitution effect reduces his demand by 2 bottles (88-90). The income effect reduces his demand by 18 bottles (70-88).

5. Yes. The substitution effect is always nonposititve.