Meeting 4. Worksheet.
CLAS. Allen.

Problem 1

x_1 Giffen good. $p_1 \downarrow$. Draw the SE, IE on a graph

Problem 2

$\mathcal{U}(x_1, x_2) = x_1 x_2$. $p_1 = 1$. $p_2 = 1$. $m = 8$.
$p_1' = 4$. Calculate the SE, IE, TE for both goods.

Problem 3

[from handout on CLAS website]

$\mathcal{U}(x_1, x_2) = 3x_1 + x_2$. $p_1 = 3$. $p_2 = 2$. $m = 18$.
$p_1' = 9$. Calculate the SE, IE, TE for both goods.

Problem 4

[from handout on CLAS website]

$\mathcal{U}(x_1, x_2) = \min\{x_1, 3x_2\}$. $p_1 = 1$. $p_2 = 7$. $m = 10$.
$p_1' = 2$. Calculate the SE, IE, TE for both goods.

Problem 5

$\mathcal{U}(x_1, x_2) = x_1 + x_2^{1/2}$. $p_1 = 2$. $p_2 = 1$. $m = 4$.
$p_1' = 1$. Calculate the SE, IE, TE for both goods.

Problem 6

You have an endowment of (ω_1, ω_2). x_1, x_2 normal goods. You are always a net buyer of x_1. $p_1 \uparrow$.
Draw the SE, IE on a graph.

Problem 7

Derive the general equation for the labor-leisure "budget constraint," starting off with: amount of money spent = amount of money made

Note: Problems 6 & 7 will be discussed in Meeting 5

Meeting 4. Worksheet Solutions
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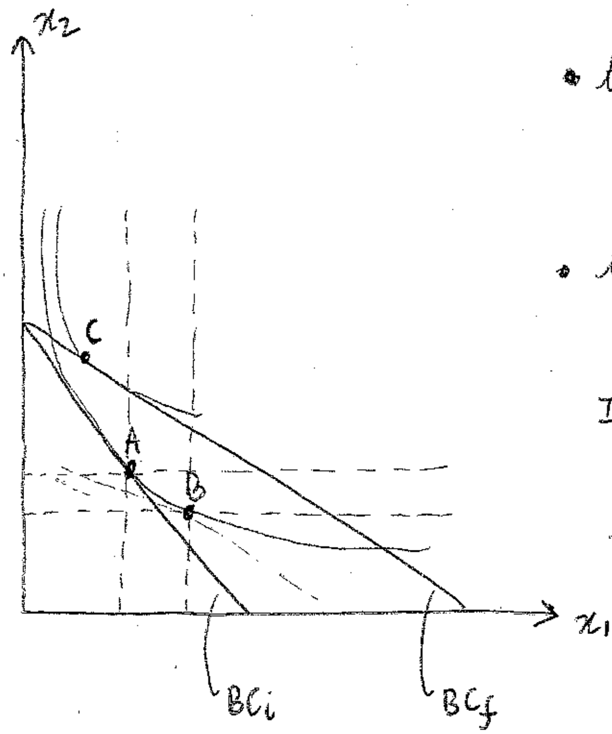
Problem 1



- to find point B: take the parallel to BC_f and make it tangent to your original IDC

- to find point C: figure out the IEs (and TEs, if possible)

IE_1: $p_1 \Downarrow \rightarrow m' \Uparrow \rightarrow x_1 \Downarrow$ (since x_1 inferior)
so IE_1 ⊖. So C to the left of B.

IE_2: $p_1 \Downarrow \rightarrow m' \Uparrow \rightarrow x_2 \Uparrow$ (since x_2 normal)
so IE_2 ⊕. So C above B.

TE_1 : $p_1 \Downarrow \rightarrow x_1 \Downarrow$ (since x_1 Giffen)
so TE_1 ⊖. so C to the left of A.

Problem 2

We need to find the coordinates of points A, B, C.

→ Point A. Cobb-Douglas. So tangency condition.

$MRS = -\frac{x_2}{x_1}$ and $MRS = -\frac{p_1}{p_2}$ so $\frac{x_2}{x_1} = \frac{p_1}{p_2}$ so $x_2 = \frac{p_1}{p_2} x_1$

we plug that in the BC:

$p_1 x_1 + p_2 x_2 = m$ so $p_1 x_1 + p_2 \left(\frac{p_1}{p_2}\right) x_1 = m$ so $2 p_1 x_1 = m$

so $x_1 = \frac{m}{2p_1} = \frac{8}{2} = 4$

& so $x_2 = \frac{m}{2p_2} = \frac{8}{2} = 4$

so $\boxed{A\ (4,4)}$

→ Point C. Same as Point A but with new prices.

$x_1 = \frac{m}{2p_1'} = \frac{8}{2 \cdot 4} = 1$ & $x_2 = \frac{m}{2p_2} = \frac{8}{2} = 4$

so $\boxed{C\ (1,4)}$

→ Point B.

- $u_A = u_B = x_1 x_2 = 16$ (1)
- At point B, we have a tangency.

"the slope of IDC = slope of compensated budget"

so $MRS = -\frac{p_1'}{p_2}$ & $MRS = -\frac{x_2}{x_1}$ so $\frac{x_2}{x_1} = \frac{p_1'}{p_2}$ so $x_2 = \frac{p_1'}{p_2} x_1$

so $x_2 = 4x_1$ (2)

- let's plug (2) into (1).

we get $x_1(4x_1) = 16$ so $x_1^2 = 4$ so $x_1 = 2$

so $x_2 = 8$

so $\boxed{B(2,8)}$

→ Table of Results.

	x_1	x_2
SE	$B_1 - A_1 = 2 - 4 = -2$	$B_2 - A_2 = 8 - 4 = 4$
IE	$C_1 - B_1 = 1 - 2 = -1$	$C_2 - B_2 = 4 - 8 = -4$
TE	$-2 - 1 = -3$	$4 - 4 = 0$

Problem 3

→ Point A.

$MRS = -3$ and $-\frac{p_1}{p_2} = -\frac{3}{2}$ so IDC steeper than BC

so consume all x_1

so $A(6,0)$.

→ Point C

$MRS = -3$ and $-\frac{p_1}{p_2} = -\frac{9}{2}$. so IDC flatter than BC

so consume all x_2

so $C(0,9)$

→ Point B

- $u_A = u_B$ so $3x_1 + x_2 = 18$
- at new prices, $x_1 = 0$ and only x_2 is consumed

so $x_2 = 18$

- so $B(0,18)$

→ Concluding table

	x_1	x_2
SE	-6	18
IE	0	-9
TE	-6	9

Problem 4

→ Point A

$x_1 = 3x_2$ and BC: $x_1 + 7x_2 = 10$

so $3x_2 + 7x_2 = 10$

so $10x_2 = 10$

so $x_2 = 1$

and so $x_1 = 3$.

so $A(3,1)$

** → Point C

$x_1 = 3x_2$ and BC: $2x_2 + 7x_2 = 10$

so $2(3x_2) + 7x_2 = 10$

so $6x_2 + 7x_2 = 10$

so $13x_2 = 10$

so $x_2 = \frac{10}{13}$

& so $x_1 = \frac{30}{13}$ so $C(\frac{30}{13}, \frac{10}{13})$

→ Point B

B is the same as A. You can see this graphically when trying to construct the SE.

So $B(3,1)$

→ Concluding table

	x_1	x_2
SE	0	0
IE	$-9/13$	$-3/13$
TE	$-9/13$	$-3/13$

Problem 5

[same as Q7, Extra Problem Set 4]

→ Point A

$MRS = -2x_2^{1/2}$. We have DMRS. So we can apply the tangency condition.

So $2x_2^{1/2} = \frac{p_1}{p_2}$ so $x_2 = \frac{1}{4}\frac{p_1^2}{p_2^2}$.

our BC is $p_1x_1 + p_2x_2 = m$

so $px_1 + p_2\frac{1}{4}\frac{p_1^2}{p_2^2} = m$ so $x_1 = \frac{m}{p_2} - \frac{p_2}{4p_1}$

which gives $A(\frac{3}{2}, 1)$

→ Point C

We just plug in the new prices in the demand functions above.

So this gives $C(\frac{15}{4}, \frac{1}{4})$

→ Point B

- $u_A = u_B$ so $u(\frac{3}{2}, 1) = \frac{5}{2} = x_1 + x_2^{1/2}$
- and $x_2 = \frac{1}{4}\frac{(p_1')^2}{p_2^2} = \frac{1}{4}$ so $x_1 + (\frac{1}{4})^{1/2} = \frac{5}{2}$

so $x_1 = 2$. So $B(2, \frac{1}{4})$

→ Concluding table

	x_1	x_2
SE	1/2	-3/4
IE	7/4	0
TE	9/4	-3/4