Problem Set. Meeting 2.
Allen

for more practice, flip the x-axis and the y-axis and draw the IDCs.

Problem 1

Draw the IDCs in each of the following situations:

a) Laüfer consumes 2 cigarettes for every shot of whiskey
b) Laüfer is indifferent between 1 pound of chocolate and 3 pounds of chocolate
c) Laüfer likes whiskey but dislikes Coca-Cola
d) Laüfer likes whiskey but is indifferent to ice cubes
e) Laüfer's ideal dinner is 4 steaks and 8 cookies

Problem 2 (Solved)

Bobby's utility function for apples and bananas is: $U = \sqrt[5]{\frac{4572}{79} a^2 b^4} + 365$.
Bobby is now consuming (2,5).
Tom steals one apple from Bobby. Victor, the local banana merchant, decides to give Bobby bananas such that Bobby is as happy as before. Approximately how many bananas would Victor give Bobby?

Problem 3 (Solved in lecture notes)

Prove that IDCs cannot cross.

Problem 4 (Solved)

Winston has linear preferences (perfect substitutes). His MRS at (12,2) is $-\frac{1}{4}$.
Compare (12,2) with the following bundles: (4,4), (6,3), (8,4), (0,6), (21,5)

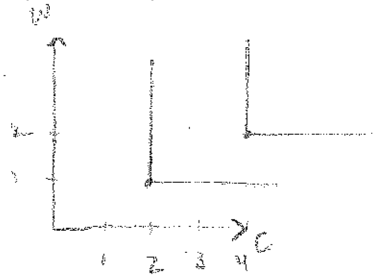
Problem 5

Laüfer thinks apples are just as good as bananas. Apples are sold in packs of 5, and bananas are sold in packs of 10. Find a utility function (and draw the IDC) for packs of apples and packs of bananas.

Meeting 2. Solutions.

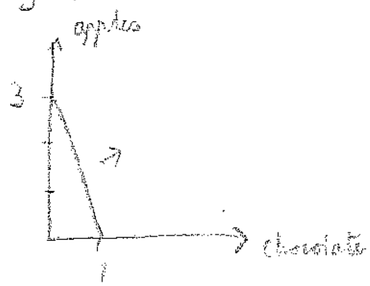
Problem 1

a) perfect complements.



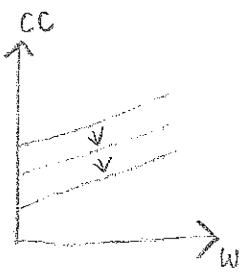
A possible utility function is $u(c,w) = \min\{c, 2w\}$

b) perfect substitutes.



$u(a, ch) = a + 3 \cdot ch$

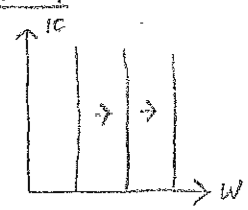
c)



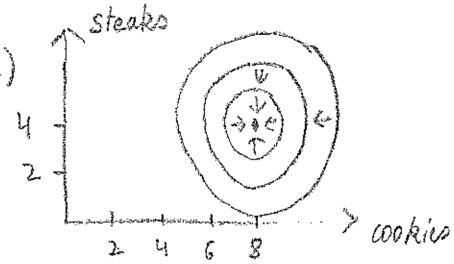
Problem Set Limited Solutions. Meeting 2
Allen

Problem 1

d)



e)



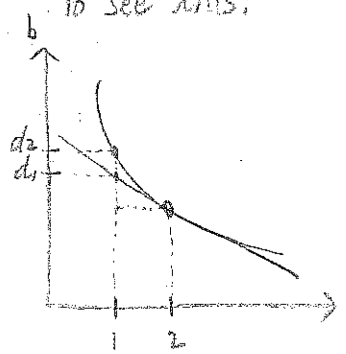
(8,4) is a satiation point, a bliss point.

Problem 2

After applying various monotonic transformations, we get an "easier" utility function: $\mathcal{U} = ab^2$.

There are 2 ways to solve this problem. One way will give you an approximate answer; whilst the other way will give you an exact answer.

- Approximate way: We have $MRS = -\frac{b^2}{2ab} = -\frac{b}{2a}$. So $MRS(2,5) = -\frac{5}{4}$.
  So $\frac{5}{4}$ is the approximate amount of bananas required for Bobby to be as happy as before.
  Why approximate, and not exact? The MRS is exact, by definition, when the change in the amount of good 1 is close to 0.
  To see this:



if we decrease a by 1 and increase b by $|MRS|(=\frac{5}{4})$, we will still be on the tangent line. (d_1 on the graph).

but the real point at which we will be indifferent must be on the IDC (d_2 on the graph)

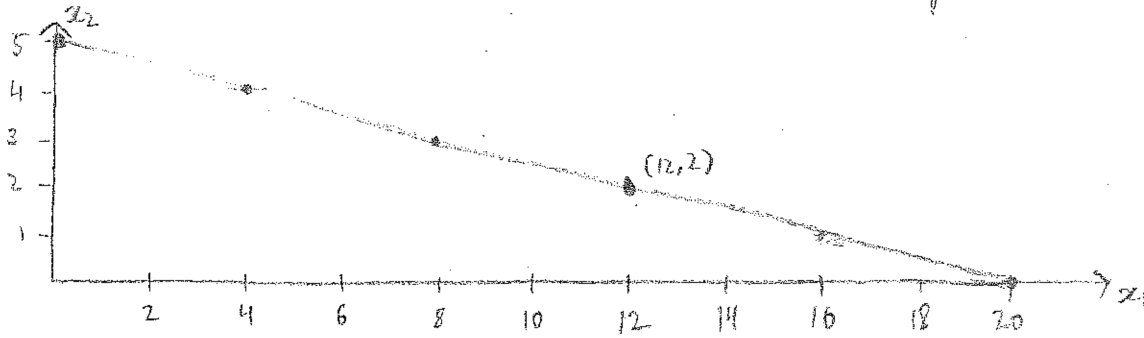
and since $\mathcal{U}$ is a Cobb-Douglas (well-behaved), then $d_1 \neq d_2$, as we can see on the graph.

- Exact way: $\mathcal{U}(2,5) = 2 \cdot 5^2 = 50$. We want the amount of bananas to be as happy as before. So: $50 = 1 \cdot b^2$ so $b = \sqrt{50} \simeq 7$.
  So the extra amount required would be: $\sqrt{50} - 5 \simeq 2$.

(IN THE NEXT MEETING, I WILL QUICKLY GO OVER THIS. IT IS IMPORTANT TO UNDERSTAND THAT THE MRS FOR BIG CHANGES IN THE AMOUNT OF GOOD 1 WILL GIVE YOU THE APPROXIMATE RATE OF SUBSTITUTION.) ignore this

Problem 4

Preferences are linear, so the IDC is a line.
MRS (12, 2) = $-\frac{1}{4}$. Since IDC is a line, MRS is constant and is the slope.
So we can now draw the IDC (since we have one point and the slope)



Now we can plot the other bundles and compare to (12, 2)

Problem 5

Think in terms of the marginal utility added per pack.
Laifer likes apples just as much as bananas.
So he likes 10 apples just as much as 10 bananas.
So he likes 2 packs of 5 apples just as much as 1 pack of 10 bananas
So one pack of bananas delivers twice as much utility as 1 pack of apples.
So: $U = P_A + 2P_B$. with P_A: pack of 5 apples
P_B: pack of 10 bananas

So: