

ECON 301, Prof. Hogendorn

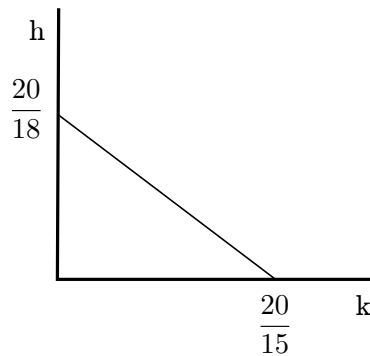
First Midterm Exam Answers

Spring 2013 (not 20132 as erroneously stated on the exam)

1. *DanBrown_a.*

(a) The written budget constraint is

$$15k + 18h = 20$$



(b) The total differential is

$$15dk + 18dh = 0$$

Solving for dh/dk gives

$$\frac{dh}{dk} = -\frac{15}{18}$$

(c) The Pixlee MRS is

$$MRS = -\frac{MU_k}{MU_h} = -\frac{0.9k^{-0.1}h^{0.1}}{0.1k^{0.9}h^{-0.9}} = -9\frac{h}{k}$$

To find the optimum, set equal to the slope of the budget constraint:

$$-9\frac{h}{k} = -\frac{15}{18} \Rightarrow h = 0.093k$$

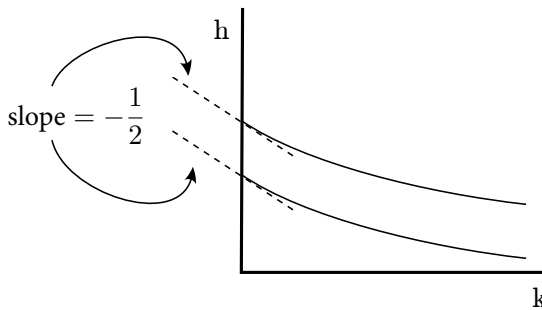
Then substitute into the budget constraint to find the optimum consumption:

$$15k + 18(0.093k) = 20 \Rightarrow k^* = 1.2, \quad h^* = 0.11$$

(d) The Inkie MRS is

$$MRS = -\frac{MU_k}{MU_h} = -\frac{0.5(k+1)^{-0.5}}{1} = -\frac{1}{2\sqrt{k+1}}$$

This is always negative, so the indifference curves are downward sloping, but when $k = 0$, the slope is $-\frac{1}{2}$. That means the indifference curves do not asymptote to the vertical axis, instead they intersect it at a slope of minus one-half:



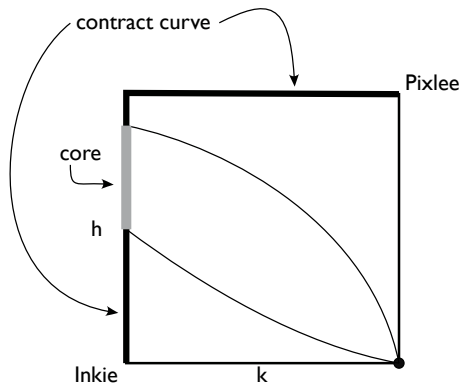
(e) The slope of the budget line is

$$-\frac{15}{18} < -\frac{1}{2}, \text{ or more intuitively, } \frac{15}{18} > \frac{1}{2}$$

Since $1/2$ is as steep a slope as these indifference curves ever have, there cannot be a tangency point within the graph, and Inkies will spend all of their money on h . Thus,

$$h^* = \frac{20}{18} = 1.11, \quad k^* = 0$$

2. *InkEdge_a*. A good (4 points) answer to this problem would be to say that since Inkies don't want to buy any kindle books at many price ratios (as shown in part (e) of problem 1), the contract curve lies along the axis where $k = 0$ for Inkies and then goes over to the Pixlee origin along the axis where $h = 1$ for Inkies.



Actually, there could be some interior points where the two types would want to trade. It would require that the Pixlee's MRS is less steep than $-\frac{1}{2}$ so that it is possible for the Pixlee indifference curve to be tangent to the Inkie indifference curve somewhere inside the diagram.

So we look for points where the Pixlee MRS has the required slope:

$$-9\frac{h}{k} > -\frac{1}{2} \Rightarrow h < \frac{k}{18}$$

So if the Pixlee has $k = 1$ and has less than $h = 1/18$, it is possible that some trade could take place. The true diagram looks like this:

