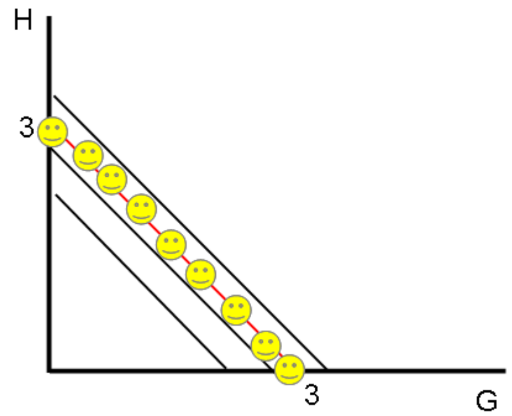
1. (3 points) As a consumer of beer, you are indifferent between Heineken (H) and Grolsch (G). You get 2 units of utility from either.

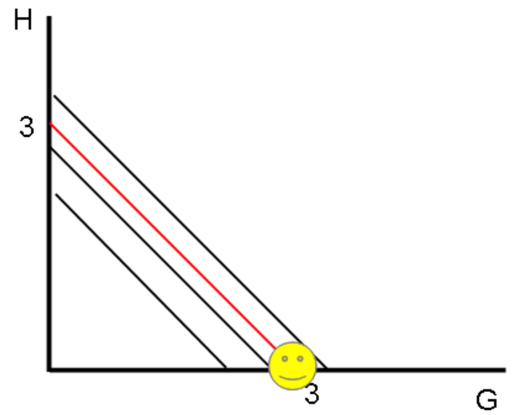
   (a) (1 point) You have €6 and you're thirsty. You go to a bar where both H and G cost €2. Draw some indifference curves, your budget constraint, and the utility-maximizing point(s) where you would choose to consume. (Label the axes and all lines.)

   Solution: These goods are perfect substitutes, i.e., $U(G, H) = 2G + 2H$. Your budget constraint (red) is on TOP of the indifference curves (ICs dont' always *curve*!). You can consume *anywhere* on the BC.



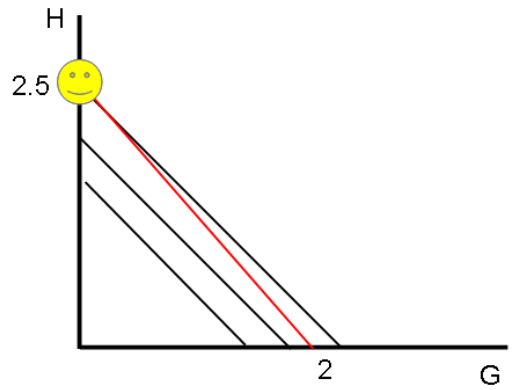
   (b) (1 point) As you're getting ready to order, the bartender tells you that there's a student special: a free glass with your purchase of G (you like glasses). Show where you consume, given this offer.

   Solution:
   This offer does not affect your preferences directly (the glass is a complementary good), but you shift to all G to get the glass(es).



   (c) (1 point) Your friend asks you to join her at a nearby bar, so she can give you the €5 she owes you. H costs €2 there, but G are €2.5. Draw a new budget line and show where you consume.

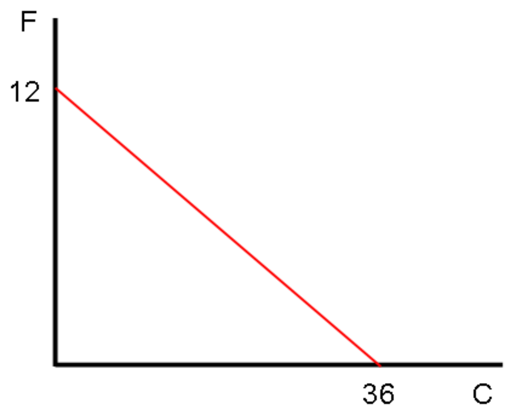
Solution:
Your BC is now at a steeper angle than your indifference curves. You consume all H (or 2 H and keep €1). Remember that utility maximization means spending ALL your budget.



2. (7 points) David Ricardo described "comparative advantage" in 1817, i.e., the potential for both sides to benefit from trade, even if one side is worse at producing both goods. We will use this idea here.

   (a) (1 point) You are stranded on a desert island, where you can catch 2 fish per hour or harvest 6 coconuts per hour. Under the tropical sun, you can only work 6 hours per day. Draw your "production potential" for fish (vertical axis) and coconuts (horizontal axis).

Solution: Note that production function is the same as a budget constraint. Maximum production quantities (axis intercepts) are at 12f, 36 c

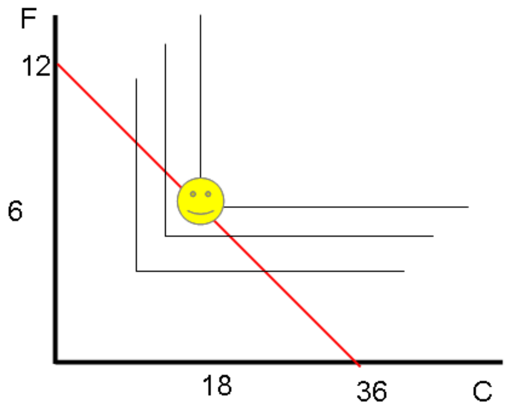


   (b) (1 point) You like to consume 3 coconuts per fish you eat, in a fixed ratio. Write down this utility function.

Solution: $U(f, c) = \min\{3f, c\}$. Note inverted coefficients on goods. Many people missed this by putting $\min\{f, 3c\}$, but you would see that's wrong by putting in a few numbers for f or c to see how utility changes.

(c) (1 point) Draw indifference curves that match your utility function and label the point indicating your utility maximizing consumption on a normal day.

Solution: Consumption is 6f, 18c, i.e., $U = \min\{18, 18\} = 18$



(d) (2 points) One day, you meet Max, a friendly guy who is also stranded on the island. He is better at harvesting both fish and coconuts (at a rate of 4 and 8 per hour, respectively), and he always likes more of either. Max offers to trade 7 fish for 15 of your coconuts. Calculate how both you and Max may be better off from trading, i.e., write down your utility and his bundle of goods before and after trade (he can also work 6 hrs).

Solution: Collect 36c, trade 15c for 7f to get 7f and 21c. $U = min\{21, 21\} = 21$. He can do 24 f or 48 c. Normally, he would give up 7 fish to get 14 coconuts (1:2 ratio), but trade allows him to get 15 coconuts, so he's better off. I did not specify Max's utility function but "always likes more of either" can be interpreted as "perfect substitutes" preferences. The function is not as important as MORE.

(e) (2 points) How is it possible that Max can benefit from trading with you when he's better at harvesting BOTH fish and coconuts? Explain using the concept of "opportunity cost."

Solution: Max is better off because he can specialize in collecting coconuts while trading for fish. Without trade, he gives up 7 fish (the opportunity cost) to get 14 coconuts. With trading, he "spends" 7 fish to get 15 coconuts. Trade allows both sides to benefit from different opportunity cost ratios, such that they can gain from their comparative advantages.