ECON 111: Fall 2021
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Practice Problems

1. Dave, George, Robin and Jerry are comedians. They all decide to produce a show and must allocate time to produce skits and standup routines. The table below shows how long it takes each comedian to produce each skit and each standup routine. They each decide to dedicate one hour to the task. Each of them can produce any linear combination of skits and standup routines provided they don't run out of time.

	Time required to make one:	
	Skit	**Standup Routine**
Dave	12 mins	15 mins
George	20 mins	6 mins
Robin	15 mins	10 mins
Jerry	15 mins	12 mins

   (a) Sketch the individual PPF's of each comedian for the hour that they have to produce skits and standup routines.

   (b) What is the opportunity cost to each comedian of producing a standup routine?

   (c) Who has the comparative advantage in producing skits?

   (d) Sketch the Joint PPF for the comedians given the hour that they have.

   (e) Suppose that the group decides to produce 11 skits and 13 standup routines for one show. Is this efficient? Is there one comedian producing both skits and standup routines, if so who?

   Let us now consider prices. We're interested in determining the price of one skit in terms of standup routines.

   (f) At what prices would Dave and George be willing to trade at? Who should specialize in skits and standup routines?

   (g) Now find the prices at which George and Robin would be willing to trade skits and standup routines. How do these prices relate to the ones you found in part (f)?

   (h) Suppose now all comedians agree on a price of $\frac{5}{4}$ standup routines for one skit. Given this price, who would choose to specialize in skits?

2. Suppose that the market for off campus student housing in Amherst is perfectly competitive. There are only three different buildings that supply off campus housing to undergraduates. All of the apartments are identical. Building 1 has 200 apartments, building 2 has 300 apartments and building 3 has 500 apartments. This supply is fixed and does not depend on market forces. The market demand for apartments is linear and described by the following equation:

$$P = 1500 - \frac{Q_D}{2}$$

(a) Graph the market supply and demand curves for apartments. (Hint: For the supply curve, does quantity vary at all with price?)

(b) What is the equilibrium price and quantity of off-campus student apartments in Amherst?

(c) What is the (renter) consumer surplus and the landlord (producer) surplus? What is total surplus?

The Amherst town council thinks that they could make money by taxing off campus student apartments. The council passes a law that states that student renters of off campus apartments must pay $100 per month.

(d) In the new equilibrium (with the $100 fee) how much do renters spend on their apartment per month? How much do landlords collect each month? What is the occupancy (i.e. the quantity of apartments filled)?

(e) Now what is the new (renter) consumer surplus? What is the (landlord) producer surplus? How much money does the government collect from the fee?

(f) Is there any deadweight loss that results from the tax? Why or why not? (Hint, what is special about this market? How is it different from most of the supply and demand models we have studied thus far?)

There is a new candidate for mayor in Amherst. The candidate suggests that the charging students a $100 per month fee is unfair and students are too poor for this, and that the greedy landlords should bear the burden of taxation. The candidate plans to eliminate any taxes paid by the students. Instead, candidate's plan states that the landlord must obtain a permit to rent an apartment. The cost of the permit is paid by the landlord. It would be $100 per month.

(g) Would the mayoral candidate's new plan change how much consumers (renters) pay for apartments (relative to your answer from part 6)? Would it change how much producers (landlords) receive in rent for the apartment (also relative to your answer from part 6)? Would it increase the Amherst city government's revenues?

3. Consider the market for lumber in the US. Suppose that the market supply and demand curves are given, respectively, as follows;

$$Q_s = \frac{P}{4} - 25$$
$$Q_d = 325 - P$$

where price is in thousands of dollars (per million board feet) and quantity is in millions of board feet

(a) Compute the equilibrium price and quantity.

(b) Compute producer and consumer surplus at the equilibrium.

(c) What is the price elasticity of demand at the equilibrium point? What about supply?

Suppose now that there an additional social cost associated with producing lumber which encompasses losses in biodiversity due to habitat destruction and reductions in the amount of oxygen produced as a by-product of photosynthesis. The additional marginal cost to society per million board feet is estimated to be \$75,000 per million board feet of lumber.

(d) Sketch the marginal social cost curve alongside the supply and demand curves. What is the socially efficient quantity of lumber? How does it compare to the market quantity you found in part (a)?

(e) Sketch the region corresponding to deadweight loss in this setting. (Hint: Remember that you want to compare the losses associated with the inefficient market quantity as compared to the socially efficient quantity. These losses are described by the marginal social cost and marginal social benefit curves).

(f) You are a policymaker interested in social efficiency. What tax would you propose to achieve the socially efficient quantity as a market outcome?

(g) For the tax that you suggested in part (f), shade the region corresponding to tax revenue in your figure. How much revenue is raised?

(h) Given your answers to part (c), which side of the market do you expect to bear a higher incidence from the tax?

(i) Compute the incidences of the tax that you found in part (f).

4. You and your roommate share a small dorm. Every evening, your roommate invites their friends over to play a popular videogame. These gatherings can sometimes extend into the morning hours and cut into your sleep schedule. The costs to you and benefits to your roommate are described in the following table:

Number of Game Nights	Your Cost	Your Roommate's Benefit
1	$0	$30
2	2	40
3	5	46
4	9	51
5	15	53
6	25	53

For example, the total cost when your roommate has 3 game nights is $5, and your roommate's benefit from 3 game nights is $46.

(a) What is your marginal cost from the 3rd game night? What is your roommate's marginal benefit from the third game night?

(b) What is the socially efficient quantity of game nights? Recall that you want to compare marginal benefit and marginal cost of each game night.

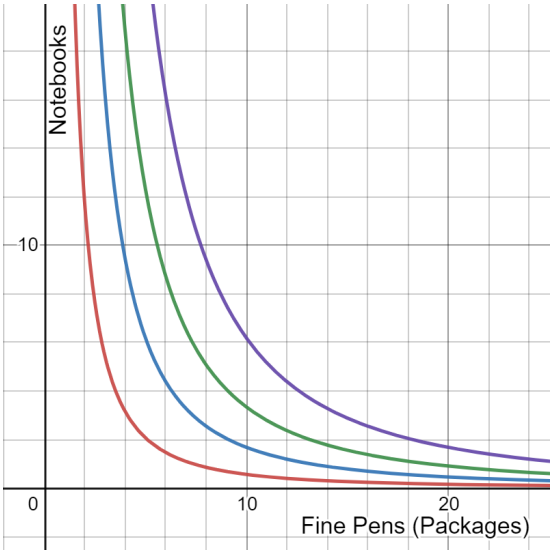
(c) Let's suppose that there are rules for quiet hours in the dorm, so that you have the right to a peaceful evening. How much would your roommate be willing to pay you to have their fifth game night? How much would you need to receive from them before you would consider taking their bribe for a fifth game night?

(d) Find a price that you can charge your roommate for game nights that ensures that the optimal quantity of game nights is reached.

(e) Now let us suppose that you have no right to a peaceful evening, and that your roommate has the right to invite guests over. How much would you be willing to pay your roommate so that they *won't* hold the fifth game night? How much would they need to receive from you before they're willing to cancel their fifth game night?

5. You use fine pens and notebooks for your studies each semester. After several years of attending school, you have a good feel for you preferences over pens and notebooks. This semester, you've allocated \$120 to purchase fine pens and notebooks. Suppose that notebooks cost \$8 a piece, and each package of fine pens costs \$10. The figure below shows some of your indifference curves for pens and notebooks.

   (a) In the figure below, sketch your budget set.



   (b) What is the slope of your budget set?

   (c) Mark the point(s) where your budget set intersects the blue indifference curve. For the point(s) that you found, how does your marginal rate of substitution compare to the slope of the budget set? How does your bang-per-buck of pens compare to your bang-per-buck of notebooks for the point(s) that you found?

   (d) At the consumption bundle which reaches the highest indifference curve, what is your marginal rate of substitution? How does your bang-per-buck of each good compare?