1. The market demand for lemons is $Q_d = 100 - 4P$. The market supply is $Q_s = 4P - 20$.

(a) Draw the **demand curve** and **supply curve** on the same diagram.

(b) What is the *equilibrium* price and quantity of lemons? $P^* = 15$; $Q^* = 40$

(c) What is the total **consumer surplus** at this price? $.5(25-15)\times 40 = 200$

(d) What is the total **producer surplus**? $.5(15-5)\times 40 = 200$

(e) What would be the cost to consumers in $ of a government ban on selling lemons? $200$
What would be the cost to producers? $200$
What would be the total **social cost** in $? $400$

(f) Suppose that the government, to support Florida farmers, mandates a minimum lemon price of $20. What is the new **consumer surplus** and **producer surplus**? What happens to total surplus? $CS_{new} = 50$; $PS_{new} = 250$; $TS_{new} = 300$ ($100$ loss in TS due to price support)

(g) Show on a diagram the area that corresponds to the loss of total surplus in (f).
2. In search of a way to fund his promised income tax reduction, and in the interest of family values, Republican Presidential candidate George Shrub proposes a “revenue enhancement” measure: a “fee” of $0.90 per bottle of beer. His opponent, John McClean, senses that this proposal may have offended Shrub’s “bubba” electoral base. He argues that it is unfair to penalize beer consumers, many of whom are vets from “Nam” trying to quiet the demons aroused by endless hours of kitchen duty in the National Guard. He would instead impose the fee only on fat cat corporate liquor producers.

(a) Suppose demand for beer is given by \( Q_d = 1250 - 125P \), and supply is given by \( Q_s = 1000P - 1000 \), where \( P \) is in $. What is the pre-tax equilibrium price and quantity?

\[
P^* = 2 \quad Q^* = 1000
\]

(b) If the fee of $0.90 is imposed on the consumers what is the new demand curve? What is the new equilibrium price and quantity? What is the amount of tax revenue?

\[
\text{New } Q_d = 1250 - 125(P+T) = 1250 - 125P - 112.5 = 1137.5 - 125P \\
P^*_{\text{new}} = 1.9 \quad Q^*_{\text{new}} = 900 \quad \text{Tax Rev.} = .9 \times 900 = 810
\]

(c) If the fee of $0.90 is imposed on the producers, what is the new supply curve? What is the new equilibrium price and quantity? What is the amount of tax revenue?

\[
\text{New } Q_s = 1000(P - T) - 1000 = 1000P - 900 - 1000 = 1000P - 1900 \\
P^*_{\text{new}} = 2.8 \quad Q^*_{\text{new}} = 900 \quad \text{Tax Rev.} = .9 \times 900 = 810
\]

(d) How much of the tax is paid by the consumer under each proposal?

Consumers pay $720 ( = $0.80 \times 900 ) of the tax under both proposals.

(e) What is the loss of total surplus (in $) from each tax?

\[
\text{Loss in TS} = $45 \quad \text{(same for both tax schemes)}
\]

(f) Kurt Vile, fresh from Econ 1 class, suggests that Shrub should instead tax insulin, since the demand curve for insulin is inelastic at \( Q_d = 900 \). What is his rational? What is the net social savings from Kurt’s proposal in $?

Kurt’s rational is to minimize deadweight loss.

Net social savings = $45
3. Suppose that in San Francisco the demand for taxi rides per hour is given by 
Q_d = 120 - 5P, while the supply is given by Q_s = -30 + 10P. The market is competitive.

(a) Draw the supply curve and demand curve. See diagram below.

(b) What is the equilibrium price of a taxi ride, and the quantity of rides per hour?

P^* = $10  Q^* = 70  See diagram below.

(c) In an effort to raise drivers' incomes Mayor Brown mandates a $12 minimum fare. What is the new quantity of rides?

Set Price floor at P_f = $12. Q_d = 60  Q_s = 90 \Rightarrow excess supply of 30. The quantity of rides will be 60 because of the limited amount of rides demanded at P_f.

(d) Explain why there is a rent seeking loss and the form the rent seeking loss will take.

Taxi drivers will compete for fares by driving around looking or simply waiting for passengers due to excess supply. Here the rent seeking losses will take the form of increased waiting time by taxi drivers.

(e) Show the area of deadweight loss from this policy on your diagram and calculate the $ amount per hour.

DWL = (12 - 9)*(70 - 60)*(1/2) = $15  See bold triangle area below.

(f) Show the area of rent seeking loss and calculate the $ amount.

RSL = (12 - 9)*60 = $180  See bold rectangle area below.
(g) Explain what happens to the drivers' *producer surplus* as a result of the fare rise. Is the average driver better off or worse off after the fare increase?

*After taking account of the RSL, PS will fall by $65 as a result of the price floor. See bold areas below.*

\[ PS_0 = (10 - 3) \times 70^*(1/2) = $245 \quad PS_1 = (9 - 3) \times 60^*(1/2) = $180 \]
The answers to parts h – j can be seen from the diagram above.

(h) Suppose instead the Mayor limits the number of taxi licenses, so that there are only enough taxis to supply 60 rides per hour. Calculate the deadweight loss from this, the rent seeking loss, and the gains or losses in drivers’ producer surplus. Is the quota on licenses more or less effective as a way of raising drivers’ income than the price floor?

$$\text{DWL} = (12 - 9)(70 - 60)(1/2) = \$15$$  This is the same as in part e as the quantity of rides is still limited to 60.

The RSL here may be zero in the short run as there is no excess supply and therefore no waiting etc. Therefore the RSL from part f will actually become PS with total PS = $(12 - 9)60 + (9 - 3)60(1/2) = \$360$.

(i) Suppose taxi licenses are not tradable. They have to be used by the person they were assigned to. In the long run (say 20-30 years from now) what is the deadweight loss from this, the rent seeking loss, and the gains or losses in drivers’ producer surplus.

However in the long run (because the right to drive a taxi is non-transferable) there could be RSL of up to the same area as in part f, but most likely it will be only a portion of that loss. This is because drivers will remain on the job longer than they otherwise might have because of the perceived benefits of having the exclusive right to drive a taxi.

This will result in $\text{DWL} = \$15$, $\text{RSL} = \text{up to} \, \$180$, and $\text{PS} = \text{at least} \, \$180$

(j) Suppose instead taxi licenses are tradable. They can be sold by the person they were originally issued to. Explain what happens in the long run now.

Now when a taxi driver wants to retire they can sell the right to drive a taxi thereby capturing all of the previous RSL. The person buying the right to drive a taxi will actually be willing to pay this extra amount for the right to drive. In this case all of the surplus (formerly RSL) will be captured by the original licensed driver.
4. "Arugula" is a popular restaurant because the food is good and the owners, Benjamin and Sally, charge prices just high enough to cover the car payments on their Volvo. As a result there is always a long line for tables, especially on weekend nights, where the wait is typically an hour. Suppose demand for meals at Arugula is given by \( Q_d = 100 - P \), where \( P \) is the price in $\$. Suppose also that the supply is fixed at \( Q_s = 80 \). Benjamin and Sally, however, charge only $10 for the meal.

(a) Draw a diagram of the market for meals at Arugula. What is the market clearing price? What is excess demand at \( P = 10 \)?

\[ P^* = 20. \text{ At } P = 10, \text{ excess demand } = 90 - 80 = 10 \text{ meals. See bold line below.} \]

(b) What, in \( S \), is the social cost of Benjamin and Sally’s good intentions? What creates this social cost?

\[ \text{Social cost } = (20 - 10) \times 80 = 800 \text{ per night. The social cost arises as people wait in line for a cheap meal. See bold rectangle area above.} \]
(c) Observing the long lines of people waiting, and wishing to spare them the discomfort of this, Benjamin and Sally build a special waiting area with seats where they serve free wine and whole grain snacks. Explain using a diagram what the effect is of their further good intentions on the social cost of their price policy.

The cost of a meal to the customer has to be $20 (the market price). Suppose that Benjamin and Sally spend $5 per customer making the waiting room more pleasant. Then the waiting time has to increase to equal $15 per person. One way to portray this is as a shift upwards of the demand curve because the value (benefit) of the meal has increased by $5. The area of rent seeking loss therefore increases. See bold area below.
(d) Kurt Vile, a rabid free marketeer and military paraphernalia enthusiast, is incensed by Benjamin and Sally’s refusal to charge the market price. He therefore takes to hanging outside Arugula on a Saturday night with a large whip flailing at the Birkenstock crowd to the snarling accompaniment of his pet Rottweiler “Maggie T.” This considerably diminishes the waiting time at Arugula to 5 minutes. Benjamin and Sally reluctantly prosecute Kurt for his activities. Kurt argues in court that his activities had no social cost. Why?

The full cost of a meal per customer was $20 with Benjamin and Sally’s pricing policy, $10 cash + $10 waiting. The cost does not change with Kurt’s attacks. All that happens is that since the waiting time is more unpleasant, the wait becomes shorter is shorter.

(e) Reluctantly Benjamin and Sally raise prices to the market clearing level to get rid of Kurt. Is anyone harmed by this decision? Explain.

The people who have the lowest incomes, and hence the lowest time value are hurt, since they benefited under the previous policy. Those with high incomes are benefited.

(f) Troubled by the profits they are now making, Benjamin and Sally celebrate the Christmas season by announcing that 9 am December 24, 1992 they will give $100 to each of the first 100 people who ask for the money at their house. Kurt is enraged and pickets the distribution with “Maggie T.” and his Boy Scout Troop. Why? Would any distribution scheme satisfy Kurt?

The entire amount they try to distribute will be lost as rent seeking, since people will line up for exactly $100 of time to get the $100. The only distribution scheme that would please Kurt would be random distribution.
5. In Berkeley there is a rent control ordinance. Suppose that the market demand for apartments is given by \( Q_d = 2000 - P \), where \( P \) is the monthly rent in S. Market supply is fixed at \( Q_s = 1400 \) apartments in the short-run. Rents are fixed at $400.

(a) Will there be any deadweight losses from the rent controls? Explain.

\( P^* = $600 \) per apartment. At a price of $400 there will be excess demand for apartments of \( 1600 - 1400 = 200 \). There will be no however be any DWL because this policy does not alter the quantity of apartments rented. The gain in surplus (from a lower price) to renters is equal to \( 200 \times 1400 = $2800 \). This gain will however most likely be depleted through rent seeking behavior. See diagram below.

(b) Will there be any rent seeking losses? If so, how much? Explain.

There will be rent seeking losses from two sources:

(i) People will compete for apartments, lining up early to see listings as soon as they are posted, and racing off to the renter. They will also stay in current apartments even when it is no longer the best location, or size etc., because of the difficulty of securing an apartment in a better location or getting a different sized apartment.

(ii) Landlords will reduce maintenance, even on very low cost items, since the rent is below the value, until the mandated rent equals the market value.
6. In both NYC and in India there are long lines for most government services – getting a driver's license, getting a building permit, and so on.

(a) Why is waiting costly to society and what is the standard solution to the problem?

*Waiting is costly because the same number of people get served each day, but at the cost of many hours of waiting. The standard solution is to increase permit and license fees to the point where \( Q_s \) equals \( Q_d \), and to use the extra money to hire more people to process the applications.*

(b) Why is that solution not implemented?

*The problem with this solution is that it hurts those who have a very low value for their time.*

(c) There is now a class of people who earn their living in both New York and India by waiting in line for those who can afford to pay them. Why does the existence of these professional “waiters” create stronger arguments for the market solution to the problem?

*Since the rich can hire the poor to wait for them it implies that the poor get no particular advantage from the waiting system of payment as opposed to the price system.*

7. The University of California charges will below the market price for a college degree in California. For example, in 1995-6 the University of the Pacific in Stockton charged $17,220 for tuition. In comparison UC Davis charged $4,174. Explain why this should create a *rent seeking loss*, and explain in what forms that loss will appear.

*Since the market cost of a UC degree is $17,220 but the university is only charging $4,174, there is now a free good to be competed over. This will be competed away in two directions (see lecture notes: 4-15, 4-17).*

(i) The administrators and the professors do not have to deliver a quality education, since if they reduce the quality all that happens is that the line of people waiting to get into the system gets shorter.

(ii) If students compete to get into the system on the basis of grades and school activities, they will devote more time to these than they would if education was charged at the market price. This competition through SAT scores and high school activities produces a social cost. Students may also pay to go to better high schools that they would otherwise choose to improve their scholastic performance.