1. The demand function is $Q_d = 20 - \frac{1}{2}P$, and the supply function is $P = 10 + Q_s$.
   a. What is the market equilibrium price and quantity?
   b. What is the consumer surplus, producer surplus, dead weight loss (DWL) and the total surplus?
   c. Is the resource allocation efficient? Why?

   Now suppose a price ceiling of 15 is set by the government.

   d. What is the price and quantity traded in the market?
   e. What is the consumer surplus, producer surplus, DWL, and the total surplus?
   f. Is the resource allocation efficient? Why?

   Now suppose a price floor of 25 is set by the government.

   g. Re-answer the questions of d. e. f.

   Now suppose instead of the price floor or ceiling, the government imposes a new consumption tax of $2 per unit.

   h. Re-answer the question of d. e. f.
   i. What is the tax revenue?

   Now suppose the government double the tax rate to $4 per unit.

   j. What is the tax revenue? Does the higher tax rate increase the tax revenue?
   k. What is the DWL? Does the higher tax rate increase the tax revenue?

2. What does the Allocation of Resources refer to?

3. (Based on a tutorial problem 3 in Tabrizi econ302 2016) There are 3 movie tickets available to be sold to 5 persons with the following WTPs:

A	B	C	D	E
20	16	10	7	2

a) How many tickets should be allocated in an efficient allocation? To whom?
b) The seller may use the following different mechanisms to sell the tickets. In each case explain how many tickets will be sold, to whom, at what prices, and whether the outcome is efficient.
   - Sell the tickets through price-taking agents on a competitive market.
   - Allow the buyers to negotiate the prices and trade among themselves.
   - Sell the tickets through a monopolist (ticket master) who sets the same price to everyone.
   - Sell the tickets at a price of $ 2 each.

4. (Based on problem 9 in Ch8 of Mankiw's book)
   Suppose the Canadian government decides that it needs to raise an additional $100 million in tax revenues. One Cabinet minister argues for a tax on all soft drinks. A second Cabinet minister

argues for a tax on cola only, since this would give consumers a choice of paying the tax (by drinking cola) or avoiding it (by switching to another soft drink).

a. Which market has the more elastic supply and demand curves: the market for cola, or the market for all soft drinks?
b. To raise the same $100 million in revenue, which would require a higher rate: a tax on cola, or a tax on all soft drinks?
c. Which would cause a larger deadweight loss: a tax on cola, or a tax on all soft drinks?
d. Which would be the better tax? Explain.

5. Suppose that the government imposes a tax on heating oil.
   a. Would the deadweight loss from this tax likely be greater in the first year after it is imposed or in the fifth year? Explain.
   b. Would the revenue collected from this tax likely be greater in the first year after it is imposed or in the fifth year? Explain.

6. What is the maximum willingness to pay (WTP)?

7. A drought in Nova Scotia reduces the apple harvest. What happens to consumer surplus in the market for apples? What happens to consumer surplus in the market for apple juice? Illustrate your answers with diagrams.

8. What kind of return to scale does a natural monopolist have? Why?

9. What is the first, second, and third degree price discrimination? Give an example for each case. Is the resource allocation efficient in each case?

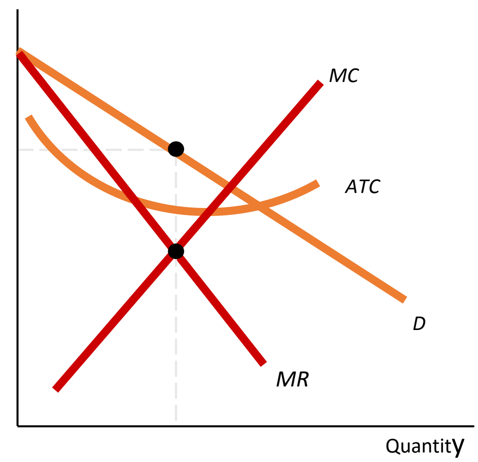
10. Most monopolies are created by the government through patents, copyrights, etc. If the monopoly is a “market failure”, why do we still have so many patents?

11. The demand function is $P = 10 - Q$, and a monopolist has $MC = Q + 1$.
    a. What is the quantity the monopolist chooses to produce? What is the price? Is the price elasticity positive? Larger than 1?
    b. At the above price, what is the consumer surplus, producer surplus, and the total surplus?
    c. What is the mark-up?
    d. At which quantity and price is the market efficient (in terms of resource allocation)? Why? What is the CS, PS, SS, and DWL here?
    e. What is the DWL of the monopoly market?
    f. If the monopolist has a fixed cost $FC = 10$. What is the monopolist’s profit?
    g. If the monopolist decides to use two-part tariffs pricing, how would it set the prices? What is the CS, PS, SS, and DWL? Is the outcome efficient (in terms of resource allocation)?

12. A monopolist has $MC = 2$, and the demand function is $Q = 20 - 2P$.
    a. What is the price elasticity at any quantity Q?

b. If the monopolist uses the linear pricing, how would it set the price and quantity? What is its profit? What is the CS, PS, and DWL? Is the outcome efficient? What is the mark-up? Is the price elasticity at the optimal quantity positive? Larger than 1?
c. If the monopolist uses the two-part tariffs, how would it set the prices? What is the quantity sold and the profit? What is the CS, PS, and DWL? Is the outcome efficient?
d. If the monopolist uses the first degree price discrimination, how would it set the prices? What is quantity sold and the profit? What is the CS, PS, and DWL? Is the outcome efficient?

13. In the graph,
    a. Please label the quantity Q, price P, the CS, PS, and the profit of the monopolist.
    b. Is the PS equal to the profit? Why?
    c. Also show the DWL, the price and the quantity that maximize the social welfare in the graph.
    d. If the monopolist uses the two-part tariffs, show the fixed fee, and the price it charges in the graph.



14. What is the supply curve of a monopoly market? Why?

15. If Boeing and Airbus plan to merge, they need to get the permission of the U.S. federal government by law. Do you support this law? Explain with the theory you have learned.

16. If the government wanted to encourage a monopoly to produce the socially efficient quantity, should it use a per-unit tax or a per unit subsidy? Explain how this tax or subsidy would achieve the socially efficient level of output. Among the various interested parties— the monopoly firm, the monopoly's consumers, and other taxpayers—who would support the policy and who would oppose it?

17. (Mankiw, ch15, p11) The residents of the town Ectenia all love economics, and the mayor proposes building an economics museum. The museum has a fixed cost of $2 400 000 and no variable costs. There are 100 000 town residents, and each has the same demand for museum visits: $Q^D = 10 – P$, where P is the price of admission.
    a. Graph the museum's average-total-cost curve and its marginal-cost curve. What kind of market would describe the museum?
    b. The mayor proposes financing the museum with a lump-sum tax of $24 and then opening the museum free to the public. How many times would each person visit? Calculate the benefit each person would get from the museum, measured as consumer surplus minus the new tax.

c. The mayor's anti-tax opponent says the museum should finance itself by charging an admission fee. What is the lowest price the museum can charge without incurring losses? (Hint: Find the number of visits and museum profits for prices of $2, $3, $4, and $5.)
d. For the break-even price you found in part (c), calculate each resident's consumer surplus. Compared with the mayor's plan, who is better off with this admission fee, and who is worse off? Explain.
e. What real-world considerations absent in the above problem might argue in favor of an admission fee?

18. (Mankiw, ch15, review question 7) Describe the two problems that arise when regulators tell a natural monopoly that it must set a price equal to marginal cost.

19. Give two examples of monopolies of different types. For each of them tell the type of the monopoly and explain why the monopoly arises?