1. The following questions ask you to consider the domestic market for gasoline. Use a supply and demand diagram to analyze each of the following scenarios. Explain briefly. ***Be sure to show how both the equilibrium price and quantity change in each case.***

   a) As the economy becomes better, both business and holiday travel increases.
   b) Geopolitical instability in major oil producing countries in the Middle East reduces the amount of oil available to import from these countries.
   c) In response to increasing minimum fuel economy requirements from the government, the automobile industry has continuously made technological progress improving the average fuel economy of vehicles sold in the U.S. market.

2. Suppose the market for AquaDoodles (once a popular toy) has a supply curve of $P = 10 + Q$, and a demand curve of $P = 150 - 6Q$. Assume that the market is perfectly competitive.
   a) What will the equilibrium price and quantity of AquaDoodles be?
   b) Calculate the producer and consumer surplus associated with the equilibrium found in part (a). Illustrate on a graph.
   c) Now, suppose the government levies a tax of $7 per Aquadoodle sold, to be paid by consumers. What is the quantity of Aquadoodles sold? What price do consumers pay? What price do producers receive? Illustrate on a graph.
   d) What do the new prices tell you about the price elasticities of supply and demand for Aquadoodles? Which is more elastic? How do you know this?
   e) Find the new producer and consumer surplus associated with your answer to part (c).
   f) How much revenue does the government raise from the tax?
   g) How does the sum of consumer surplus, producer surplus, and revenue after the tax (your answers to (d) and (e)) compare to the sum of producer and consumer surplus found before the tax (your answer to (b))? What does the difference between the two represent?

3. To encourage increased growth of grasslands in the Animal Kingdom, their leader, Simba, is considering a subsidy for production of grasslands. Suppose that the market for grasslands can be represented by the following equations:

$$\text{Demand:} \quad P = 200 - 1.5Q$$
$$\text{Supply:} \quad P = 50 + Q$$

where P is the price per acre, and Q represents quantity of grasslands, represented in acres consumed per week.

   a) Calculate the equilibrium price and quantity of grasslands before the subsidy.
   b) To encourage grassland production, Simba announces a price floor of $140 per acre. With this new price floor, what will be the new quantity of grassland consumed in the Animal Kingdom?
   c) Illustrate your answers to (a) and (b) on a graph. Using this graph, calculate the consumer surplus and producer surplus at the initial equilibrium price and quantity from part (a).
   d) Calculate the new consumer surplus and producer surplus with the price floor of $140 per acre (part b).
   e) How does the total consumer and producer surplus in part (c) compare to the total consumer and producer surplus in part (d)? What explains the difference in these two figures?
   f) Suppose that the government supports the $140 per acre price by purchasing any excess grassland that producers make available but are unable to sell to other animals. How many acres of grassland must the government buy?

4. Prince Edward Island is considering raising the fare for the ferry connecting the island to the mainland of Canada by 20%. You have been asked to project whether the fare increase will lead to an increase or decrease in revenues. You have been given the following data pertaining to the last time that fares were increased:

	before increase	after increase
riders per day:	3,000	2,650
fare:	$10	$12.50

   a) Based on the figures provided, calculate the price elasticity of demand for trips on Prince Edward Island's ferry.
   b) Based on your calculation above, would you expect revenues to increase or decrease if the fare rose by another 20 percent? Why?

5. Reggie consumes only two goods, chocolate and sausage. Suppose that the price of both chocolate and sausage doubles. At the same time, Reggie is given a raise at work, so that his income also doubles. What affect do all of these changes have on Reggie's budget constraint? What does this problem tell you about the effect of inflation that doubles all prices, but in which income also doubles?

6. Prior to 1979, the food stamp program required families to pay a certain amount for food stamps. Suppose a family can receive, for example, $150 in food stamps for a payment of $50 (that is, the government pays 2/3 of the cost of food). How would this policy affect the budget line? Compare this plan to an outright gift of $100 in food stamps, which is the way the program works now. Add that budget line to your graph. What would you need to know to determine whether an outright gift of $100 would lead to more, less, or the same food consumption?

7. Concerned about increasing tuition rates, Earnest Dummies Unite! (EDU!) proposes an income tax rebate designed to offset increased costs. This question asks you to evaluate their proposal. To begin, consider the following facts for a typical college-aged family:
   - Before the increase, tuition rates are $500 per credit hour.
   - The typical family with a college-aged student purchases 24 credit hours per year.
   - The typical family has $50,000 of disposable income to spend on education or other consumption goods.

a) Draw a budget constraint and indifference curve for the typical family before rates increase. On the *x*-axis, education should be measured in credit hours purchased. On the *y*-axis, other consumption can be measured in dollars. Be sure to show the endpoints of the budget constraint, as well as the levels of credit hours and other consumption chosen by this family.

b) Reproduce your diagram from part (a). Now, consider an increase in tuition rates to $625 per credit hour. As a result of the rate increase, the typical family now only consumes 21 credit hours per year. Add the new budget constraint to the diagram, along with a new indifference curve showing the change in consumption patterns.

c) Reproduce your answer to (b). Now, consider the proposal from EDU!. They argue that families with college-aged children should receive a $3,000 tax rebate. This will allow them to afford the same combination of credit hours and other consumption that they had before tuition rates rose. Add a budget constraint representing this policy to your diagram.

d) Finally, consider the effects of the proposed tax rebate on welfare. When given the income tax rebate, will families choose to purchase 24 credit hours? How can you tell this? Compared to their utility in part (a) (before the tuition increase), are families worse off, better off, or the same when tuitions are higher and the tax rebate is in place? Explain intuitively why this is the case.

8. You manage one department in a large corporation. Two years ago, you had 20 workers and produced 40,000 units. The company allocated 10 more workers to your department last year, and output increased to 45,000. You just received a memo from your boss indicating that he is very concerned about the 500-unit fall in the average productivity of your workers. How can you defend yourself?

9. You are in charge of cost control in a large metropolitan transit district. A consultant you have hired comes to you with the following report:

> Our research has shown that the cost of running a bus for each trip down its line is $30, regardless of the number of passengers riding the bus. Each bus can carry 50 people. At rush hour, when the buses are full, the average cost per passenger is 60 cents. However, during off-peak hours, average ridership falls to 18 people, and average costs soar to $1.67 per passenger. As a result, we should encourage more rush hour business when costs are cheaper, and discourage off-peak business when costs are higher.

Should you follow the consultant's advice? Why or why not?

10 CSI, Community Services, Inc., uses a combination of high school students and professional staff to provide services to low-income families in the community. High school students are able to serve 4 families per day, whereas professional staff can serve 20 families per day. Students are paid $40 per day, whereas professionals are paid $100 per day. Their accountant argues that CSI could lower costs by using more students and fewer professionals, while still serving the same number of families. Given the data above, do you agree with this assessment? Why or why not?

11. Tom's Terrific Turkeys is getting ready for the Thanksgiving rush. Turkeys sell for $30 each, and the market is perfectly competitive. Tom has prepared the following data for his firm:

Q	TC	MC	ATC	AVC
0	$10	--	--	--
1	$20	$10	$20	$10
2	$35	$15	$17.5	$12.5
3	$55	$20	$18.33	$15
4	$80	$25	$20	$17.5
5	$110	$30	$22	$20
6	$145	$35	$24.17	$22.5

a) What are the fixed costs for Tom's firm? How do you know this?
b) Given the current market price of $30, at what quantity would Tom maximize profits? Explain the economic intuition behind your answer.
c) Is a price of $30 a long-run equilibrium for the turkey industry? Why or why not?
d) Suppose the price fell to $15? How many turkeys would Tom sell now? Would he make a profit? Should Tom continue to operate in the short run? Why or why not?

12. This question asks you to consider the market for cab rides in Metropolis. The city is currently served by several cab companies, each who own multiple cabs and hire drivers to operate them. The number of cab companies is sufficiently high to consider the market perfectly competitive.

  a) The industry is currently in long-run equilibrium. Using two diagrams, one to represent the market for cab rides, and a second to represent the costs of a typical cab company, illustrate the current price, quantity and profits of a typical cab company. Explain why you have drawn the curves as you did.

  b) To reduce traffic in Metropolis, city managers have reduced the number of parking spaces in the city. This has reduced the number of people who bring their own cars into the city, and increased demand for cab rides. Show how this affects the market equilibrium, price, and profits immediately after the policy takes affect. Using one diagram for the cab ride market and a second for a typical cab company, illustrate below.

  c) Will the scenario you have described in part (b) be a stable long-run equilibrium? Why or why not? Once again using separate diagrams for both the industry and a typical cab company, illustrate the long run equilibrium for cab rides in Metropolis.

  d) To avoid the possibility you discuss in (c), cab companies lobby for licensing rules that prohibit new entry. They argue that, to avoid new congestion problems, only drivers approved by the city should be allowed to operate cabs. Moreover, they argue that the number of approved drivers should equal to the number of drivers operating before the number of parking spaces was reduced. How would that change your answer to part (c)? Why?

  e) Economists often call such lobbying efforts "rent seeking" behavior. Why do you think this is? What is the most that the industry would be willing to spend on such lobbying?

13. Evaluate the following statement:
"The First Theorem of Welfare Economics states that as long as producers and consumers act as perfect competitors, and there are no other market failures, a Pareto efficient allocation of resources emerges. Thus, if market failure is not evident, there is no justification for government intervention in the economy."

14. For each of the policy proposals below, identify who the potential beneficiaries and losers (if any) are. Then, state whether the change is likely to be:
  1) a Pareto improvement
  2) an improvement in social welfare using a Rawlsian social welfare criterion.
Explain briefly.

  a) Providing free health care to low-income families, financed by increasing income taxes
  b) Providing free public wi-fi, financed by an increase in sales taxes
  c) Providing free public wi-fi, financed by a tax on cell phone users.

15. Doug's Dogs has the exclusive rights to hot dog vending at SU football games. Assume that the marginal cost of producing hot dogs is constant at $1. Daily demand for hot dogs is P=5-(Q/20). Assume that fixed costs equal zero.
    a) Find Doug's profit-maximizing quantity of hot dogs and the price at which hot dogs are sold.
    b) What are Doug's profits? What is the consumer surplus?
    c) Suppose competition is allowed among hot dog vendors at the games. What will the new price and quantity be? Explain how this problem differs from the monopoly problem above.
    d) Find the new consumer surplus and profits. How does the sum of consumer surplus and profits in the monopoly case (part b) compare to consumer surplus with perfect competition? Explain any differences between the two.

16. *Using theories discussed in this class*, what rationale can you provide (if any) for government intervention in the following areas? Your answer should both clearly state whether or not you think the proposed service makes sense, and should use economic logic to defend your answer.
    a) Prohibiting smoking in public buildings
    b) Food stamps
    c) Public transportation

17. Canterbury and Midland are remote regions in the country of Amazonia separated by a large mountain range. To travel from one region to the other, drivers must either take a series of narrow, windy roads over the mountains or drive around the mountain range. Either route takes 3 hours to complete.

    The leader of Amazonia proposes building a tunnel through the mountains. This tunnel will provide a direct route connecting Canterbury and Midland, and reduce the travel time between these regions to just 45 minutes. Because the tunnel will reduce travel times, reduce congestion on narrow mountain roads, and stimulate economic development in these regions, he argues that the tunnel is a public good.

    Do you agree? Using theories discussed in class, should the tunnel be considered a public good?

18. Suppose three neighbors must vote on installation of a traffic light that costs $210. All three will share the cost of the light – that is, each person will contribute $70 to the installation. Leona values the light at $50; Lionel values the light at $50; and Theo, who drives the most, values the light at $200.
    a) Explain why the traffic light is a public good.
    b) Is it efficient for the traffic light to be installed? Why or why not?
    c) Suppose a majority rule vote is held to determine whether the light should be installed. Will the light be installed? Explain any differences between this result and your answer in part (b).

19. Mack's Messy Marbles manufactures marbles. The marginal cost per bag of marbles is $4. The marbles are carefully hand-painted by local artisans. Unfortunately, while painting such small surfaces, much paint is spilled and drains into the local river. Many families live along the river, and they all own boats. Thousands of boats that are docked along the river are harmed by this paint. The damage done by the paint can be represented by the equation $MD = 0.2Q$. The demand curve for marbles is $P = 22 - Q$.

    a) From a societal viewpoint, what is the efficient level of marble production?
    b) How many marbles are produced without government intervention?
    c) What can be done to ensure that an efficient number of marbles are produced?

20. Negotiators are currently working to craft a new international agreement to limit emissions of greenhouse gases that contribute to climate change. Consider two hypothetical countries, Freedonia and Drusselstein. Below are estimates of the marginal costs of abatement of greenhouse gases for each country:

Abatement (in tons)	Freedonia	Drusselstein
1	$15	$25
2	$20	$35
3	$25	$45
4	$30	$55
5	$35	$65
6	$40	$75
7	$45	$85
8	$50	$95
9	$55	$105
10	$60	$115

    a) The negotiator's goal is to reduce 10 tons of greenhouse gas emissions. To do this, they first consider requiring each country to abate 5 tons. What is the total cost of abatement for Freedonia? For Drusselstein? What is the combined total for both countries?

    b) Is this the cheapest way to reduce 10 tons of emissions? If not, can you suggest a better strategy? How many tons should Freedonia reduce to minimize clean-up costs? How many tons should Drusselstein reduce to minimize clean-up costs? Please explain how you found your answer.

    c) For firms within a single country, what types of policies are used to achieve an allocation of clean-up responsibility such as you suggested in part (b)? Explain how such policies work to bring about the efficient solution. What hurdles might the implementation of such a policy face in an international setting, when allocating emission reduction responsibilities across countries, rather than across firms within a single country?

21. Characterize each of the following as an example of (i) adverse selection, (ii) moral hazard, or (iii) principal-agent problem. Explain briefly.
    a) A savings and loan association, with federally insured funds, makes risky investments.
    b) A physician prescribes tests that are relatively expensive and ineffective for treating a patient's illness.
    c) An employee signs up for disability insurance, aware of having an illness that is likely to be disabling.

22. Concerned about trash in neighborhood parks, the city of Urbana has decided to undertake a beautification project. As a result of cleaner, more attractive parks, they expect that park attendance will increase by 10%. They also project that property values of homes near the park will increase by $5,000 per home. There are 1,000 homes that are considered "near" local parks.
    a) What are the benefits of the beautification project?
    b) How would you measure these benefits?

23. We Like Sports (WLS) is a group of citizens lobbying for a new sports stadium for the local baseball team. They argue that the new stadium would have several benefits:
    • Currently, the team attracts 1 million spectators a year. WLS projects that with the new stadium, 1.5 million fans will attend games. Each fan spends $30 at the game, which generates $3 in taxes. This will create additional revenue for the city.
    • In addition to spending money on the games, WLS argues that these fans will bring more revenue to the city. They project that one-half of these fans will eat at restaurants near the stadium, either before or after the game, providing a needed boost to the struggling neighborhood around the stadium.
    • Finally, WLS projects that 10% of these fans will travel from a town more than two hours away, and will choose to stay in a local hotel after the game.

    You have been hired by the city to provide an impartial analysis of the proposed stadium. As part of this analysis, you have been asked to critique the claims of WLS. Do you agree with the potential benefits? In preparing a cost-benefit analysis, should these benefits be considered? Please explain your answer.

24. A recent Department of Transportation study shows that purchasing automated safety equipment packages (e.g. automated braking, blind spot detection) reduces the risk of death in a car accident by 1 in 1,500. That is, for every 1,500 people that purchase automated safety equipment when they buy a new car, 1 less person will die in a car accident.

You have been asked to use this information to estimate the value of a life for a cost-benefit analysis on new safety regulations. After careful study, you have determined that the demand curve for automated safety equipment is:
$$P = 8,000 - 0.5Q$$
where Q represents the number of car buyers who purchase an automated safety equipment package.

   a) Automated safety equipment currently costs $2,000. At this price, how many car buyers will purchase automated safety equipment? Illustrate on a graph.
   b) What is the total willingness to pay for the number of automated safety packages purchased that you found in part (a)?
   c) Based on the results from the Department of Transportation study, how many lives will be saved if this number of safety packages are purchased? Using this information and the total willingness to pay found in part (b), calculate the value of a life saved to a typical car buyer.

25. Suppose that the city of Lawrence is debating whether to begin a two-year project designed to fix up the streets of Lawrence. They will spend $500,000 on labor now, and an additional $500,000 next year. In addition, the city must also pay out an additional $100,000 this year to purchase materials for the project.

The present value of the benefits generated by better-quality roads is estimated to be $1 million. The city uses a 5% discount rate to evaluate all public projects.
   a) What is the present value of costs associated with the project?
   b) Is the project admissible? Why or why not?

26. Consider two projects. The first has a large setup costs, but provides larger benefits afterwards. The second involves no set up, but provides only minimal net befits each year. The net benefits of each project in each year are listed below:

Project	Year 0	Year 1	Year 2	Year 3
A	-$200	$100	$100	$100
B	$100	$100	$100	-$250

You may assume that all values are presented as real dollars.
   a) Suppose that the real discount rate is 3%. Which project is preferable? Why?
   b) Suppose that the real discount rate is 7%? Which project is preferable? Why?
   c) Explain intuitively why the results differ in parts (a) and (b).