

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:

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

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

- Calculate the equilibrium price and quantity of grasslands before the subsidy.
 - 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?
 - 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).
 - Calculate the new consumer surplus and producer surplus with the price floor of \$140 per acre (part b).
 - 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?
 - 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

- Based on the figures provided, calculate the price elasticity of demand for trips on Prince Edward Island's ferry.
- 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 the environmental effects of driving, Transport of Tomorrow (TOT), an environmental advocacy group, proposes increasing the tax on gasoline.
 - a) Draw a budget constraint for a typical family before the proposed tax increase. Assume that gas currently sells for \$3 per gallon, and that the typical family has \$3,000 per month to spend.
 - b) Reproduce your graph from part (a). Suppose that TOT's proposed tax would increase the price of gas by \$1 per gallon. Add a second budget constraint below representing this new price. Add a set of indifference curves showing how gasoline consumption would change if the tax were approved.
 - c) To counter claims that the tax is unfair, as well as general opposition to taxes, TOT proposes that the revenues raised from the gasoline tax be used to lower income taxes. Thus, the tax will raise no new revenue for the government.

Reproduce your diagram from part (b). Add a third budget constraint showing the choices available to consumers with higher gasoline prices after the rebate. (*Hint:* Consider how much money for other consumption the family would have if they purchased the amount of gas in part (b) but did not have to pay the tax. The difference between that amount and the amount they have left after the tax is the tax revenue.)
 - d) Compared to their pre-tax welfare, would consumers be better off, worse off, or equally happy if the tax and rebate plan is put into effect? Explain.

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

- What are the fixed costs for Tom's firm? How do you know this?
- Given the current market price of \$30, at what quantity would Tom maximize profits? Explain the economic intuition behind your answer.
- Is a price of \$30 a long-run equilibrium for the turkey industry? Why or why not?
- 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 effect. 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.a) Explain how perfectly competitive markets result in output efficiency.

b) Explain why monopolies are a type of market failure. In particular, what part of your answer to part (a) is violated when a product is produced by a monopoly?

14. 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.

15. 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

16. 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?

17. 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).

18. 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?

19. 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

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

22. 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.

23. Suppose that a proposed dam would provide irrigation water to be distributed free to farmers, who would use it to grow an additional 20,000 bushels of sugar beets per year. The price of sugar beets is \$1 per bushel. In addition to the water, the production of the sugar beets would require \$8,000 worth of other inputs per year. No alternative source of irrigation water is available.

- a) Assume that the price of sugar beets is determined in a perfectly competitive market, in which millions of bushels of beets are sold every year. What is the annual value of the irrigation water? Explain.
- b) Currently, the risk-free nominal interest rate is 6.25%, and inflation is 3.5%. Show how you would find the present value of the net benefits found in part (a), assuming that the project has a lifespan of 30 years. (Note: You do not need to carry out the calculation. Simply show how you would set it up.)
- c) Now, suppose that all the facts from part (a) remain unchanged, except that the government sets a price floor for sugar beets above the market equilibrium price and that it supports this price by buying the excess supply of sugar beets and letting them rot. (Assume this policy is in place even before the irrigation project is being considered.) Now what is the value of the irrigation water produced by the project?

24. 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?