# [Chapter 1 (Common): End-of-Chapter Solutions]

## **Discussion and Review Questions**

### Question 1

1. Consider the following statement: “Economists always put things into monetary terms; as a result economics can most appropriately be called the study of money.”

Is this true or false? Briefly explain your reasoning.

### Solution 1

1. This is false. Economists use monetary values because they provide a common metric for measurement that enables them to compare the costs and benefits of a variety of different outcomes. Essentially, it allows economists to compare apples to oranges. Expressing benefits and costs in monetary terms simplifies the process of analyzing the decisions that we make in our everyday lives. Economics, therefore, is more accurately described as the study of the decisions that are made by individuals, firms, and governments.

### Question 2

2. Use the cost-benefit principle to evaluate the following:

a. You are about to buy a calculator for $10, and the salesperson tells you that the model you want to buy is on sale for $5 at the store’s other branch, which is a 20-minute drive away. Would you make the trip?

b. You are about to buy a laptop for $1,000 and the salesperson tells you that the model you want to buy is on sale for $995 at the store’s other branch, which is a 20-minute drive away. Would you make the trip?

c. Did you make the same choice in both cases? Should you have? Do you think this is how people actually choose?

### Solution 2

**2.** Student answers will vary. To apply the cost-benefit principle, analyze the full set of costs and benefits (both monetary and non-monetary) of both alternatives. Only pursue the choice whose benefits are at least as large as the costs to maximize your economic surplus. Convert costs and benefits into dollars using your willingness to pay.

In parts a and b, your answer will depend on your willingness to pay. If you buy at the current store, you will get the benefit of having the calculator and laptop now. If you buy at the other branch, you save money off the purchase, but you forgo gas cost and travel time. How much does the gas cost, and how much is your time worth to you?

For part c, note that in both cases, if you accept the offer, you are driving 20 minutes to save $5. Your answer should be the same in both cases. However, many people may fall victim to the framing effect, when a decision is affected by how a choice is presented. Saving $5 off the calculator is 50% off the retail price. Saving $5 off the laptop is 0.5% off the retail price. In both cases, the savings is $5. Although the framing effect is common, it is not rational. You should make decisions based on the costs and benefits, not by how they are framed.

### Question 3

3. During the economic downturn of 2008–2009, the unemployment rate increased to nearly 10%. At the same time, the price of college tuition and the number of college enrollees increased. Using the opportunity cost principle, explain why more people would enroll in college during this time period even as the price of college increased.

### Solution 3

3.One of the main costs associated with going to college is that individuals are giving up the opportunity to work in the labor market instead. One of the key opportunity costs then is the earnings that a student would have earned had they decided not to attend college. When the economy is in a recession, there are fewer jobs available and wages tend to be lower than when the economy is not in a recession. Therefore, the opportunity cost of going to college is also reduced during a recession.

### Question 4

4. A friend once remarked that longer movies were a better deal than shorter movies because the ticket price was the same in both cases. Therefore, the longer movie provided more benefit for the same cost as a shorter movie. Using the opportunity cost principle, evaluate your friend’s statement.

### Solution 4

4. When making an economic decision, you need to incorporate all the costs and benefits involved. The ticket price is only part of the opportunity cost of watching a movie. There are also the time costs. With longer movies, the time costs are greater. This is one of the reasons why movie studios often try to limit the length of films; they are concerned that longer films may turn away customers due to the additional opportunity costs. However, it may also be the case that the additional plot development and enjoyment received from a movie are enhanced when the duration is extended. Ultimately, individuals must do a cost-benefit analysis that includes all the costs and benefits, not just the monetary out-of-pocket costs.

### Question 5

5. In 2016, the top-selling pharmaceutical drug in the world was AbbVie’s *Humira,* which is used for the treatment of several common, chronic conditions. The majority of its profits are derived from treatment of the most common diseases, so why does AbbVie develop drugs for rare diseases instead of investing all of its resources towards drugs for common diseases? Use the marginal principle to briefly explain your answer.

### Solution 5

5. This is an application of the marginal principle. As pharmaceutical companies continue to develop drugs for widespread, chronic diseases, eventually the additional benefit they receive from producing an additional drug when others are already on the market will decrease. At some point, it will become more profitable for the pharmaceuticals to produce a first drug for a rare disease with few patients than to produce an additional drug for a more common disease.

### Question 6

6. You are a preschool teacher working at a public school, but are considering quitting your job to start a day-care facility of your own. Describe four types of dependencies that will affect your decision, with at least one example for each.

**Solution 6**

6. Student responses will be quite diverse for this question. Some example of dependencies may include having to live with the uncertainty of owning your own business compared to having a set salary as a public school teacher, how many other day cares are open in the area, how the labor market is doing in your region, expectations about the future, etc.

## Study Problems

### Problem 1

1. Ivan has inherited his mother’s 1963 Chevrolet Corvette, which he values at $45,000. He decides that he might be willing to sell it so he posts it on Craigslist for $55,000. Samantha is interested and willing to pay up to $72,000. Would Ivan and Samantha want to voluntarily engage in trade? How much economic surplus is created for both of them as a result of this exchange? What is the total economic surplus?

### Solution 1

1. Yes. In this case the benefit Ivan receives is the $55,000. The cost is that Ivan is no longer able to receive benefits from owning the car, which he values at $45,000. Since the benefits exceed the costs, Ivan would voluntarily engage in this exchange because doing so makes him better off. In this case the benefit Samantha receives is the $72,000 she is willing to pay. The cost is the price she ends up paying, which is $55,000. Since the benefits exceed the costs, Samantha would voluntarily engage in this exchange because doing so makes her better off. Notice that both Ivan and Samantha are benefiting from this voluntary exchange. Ivan values the car at $45,000 and receives $55,000, so his economic surplus is $55,000 − $45,000 = $10,000. Samantha values the car at $72,000 and it costs her $55,000, so her economic surplus is $72,000 − $55,000 = $17,000. Total surplus is the combination of Ivan and Samantha’s surplus, $27,000.

### Problem 2

2. You are considering whether you should go out to dinner at a restaurant with your friend. The meal is expected to cost you $40, you typically leave a 20% tip, and an Uber will cost you $5 to get there. You value the restaurant meal at $20. You enjoy your friend’s company and are willing to pay $30 just to spend an evening with her. If you did not go out to the restaurant, you would eat at home using groceries that cost you $8. How much are the benefits and costs associated with going out to dinner with your friend? Should you go out to dinner with your friend?

### Solution 2

2.The benefits are $58. You receive $20 worth of benefit from the restaurant meal itself. You also receive $30 worth of benefit from having dinner with your friend. Additionally, by not eating at home, you will save $8 on the groceries you would have purchased. The total benefit, therefore, would be $58. The costs are $53. The price of the meal will be $40. You will also leave a 20% tip, which adds another $8. Your car fare is $5. So, the total cost would be $53. The total benefits are equal to $58 and the total costs are equal to $53. So, going to dinner with your friend will yield $5 worth of economic surplus and you should go out to dinner with your friend.

### Problem 3

3. It is a beautiful afternoon and you are considering taking a leisurely stroll through the park. There are several other activities you had considered doing instead. The value you would have received from each of the activities is provided in the table below:

| **Alternative activities** | **Value** |
| --- | --- |
| Streaming a movie | $5 |
| Taking a nap | $8 |
| Chatting with your best friend | $13 |
| Reading a new book | $15 |

What is the opportunity cost to you of taking the stroll through the park?

### Solution 3

3.$15. In this case, you are using two hours of your time and that time could have been used for something else. The opportunity cost, therefore, is the value you would have received from the next best alternative use of that time. In this case, that the $15 worth of value you would have received had you decided to read a new book.

### Problem 4

4. Suppose you have midterms in economics and astronomy tomorrow, and you only have four hours left to study. The accompanying table provides the combinations of time spent studying economics and astronomy and your expected exam scores.

| **Hours spent studying economics** | **Economics exam score** | **Hours spent studying astronomy** | **Astronomy exam score** |
| --- | --- | --- | --- |
| 0 | 60 | 0 | 70 |
| 1 | 80 | 1 | 83 |
| 2 | 90 | 2 | 87 |
| 3 | 95 | 3 | 90 |
| 4 | 98 | 4 | 92 |

1. Draw a production possibilities frontier to illustrate your study options. What is the opportunity cost, in terms of your grades, of studying one extra hour for economics or one extra hour for astronomy?
2. If your goal is to maximize your combined exam scores, how many hours should you spend studying each subject?
3. Your laptop dies and refuses to start up. All your notes and class materials are saved on its hard drive. How do your production possibilities change? Illustrate in your graph from part (a).

### Solution 4

4. a. To illustrate your study options on a PPF, you first need to determine how much you improve your economics score and your astronomy score with each additional hour spent studying each subject.

| **Hours spent studying economics** | **Economics exam score** | **Improve Economics score**  | **Hours spent studying astronomy** | **Astronomy exam score** | **Improve Astronomy score**  |
| --- | --- | --- | --- | --- | --- |
| 0 | 60 | **0** | 0 | 70 | **0** |
| 1 | 80 | **20** | 1 | 83 | **13** |
| 2 | 90 | **30** | 2 | 87 | **17** |
| 3 | 95 | **35** | 3 | 90 | **20** |
| 4 | 98 | **38** | 4 | 92 | **22** |

Next, you can determine your possible study combinations and the corresponding score improvements.

| Possible Study Combinations | Corresponding Score Improvement (points) |  |
| --- | --- | --- |
| Hours Studying Astronomy | Hours Studying Economics | Astronomy | Economics | Total Combined Score |
| 0 | 4 | 0 | 38 | 70 + 98 = 168 |
| 1 | 3 | 13 | 35 | **83 + 95 = 178** |
| 2 | 2 | 17 | 30 | 87 + 90 = 177 |
| 3 | 1 | 20 | 20 | 90 + 80 = 170 |
| 4 | 0 | 22 | 0 | 92 + 60 = 152 |

Finally, graph your PPF.



Your study time experiences increasing opportunity costs, illustrated by a PPF that is a bowed-out curve. This differs from a linear PPF, which has constant opportunity costs. Your opportunity cost, in terms of your grades, of studying for one additional hour depends at which point you begin on your PPF. For example, suppose you initially intend to study for astronomy for 0 hours and economics for 4 hours. You would improve your astronomy score by 0 points and your economics score by 38 points. If you increase your astronomy studying by 1 hour, you gain 13 points on your astronomy score but lose 3 points on your economics score. Instead, suppose you initially intend to study astronomy for 3 hours and economics for 1 hour. You would improve your astronomy score by 20 points and your economics score by 20 points. If you increase your astronomy studying by 1 hour, you gain 2 points on your astronomy score. However, you now lose 20 points from your economics score, a much greater opportunity cost than the previous scenario.

b. 1 hour studying astronomy, 3 hours studying economics. When you increase the time spent studying economics from two hours to three hours, this also means that you will decrease your time spent studying astronomy from two hours to one. As a result, your economics score increases by 5 points and your astronomy scores decreases by 4 points. Your overall combined score will rise by one point. However, if you increase your time spent studying economics from three hours to four hours, then your time spent studying astronomy will fall from one hour to zero. You will gain 3 points in economics but lose 13 points in astronomy. You would not want to do this, since your combined score will fall by 10 points.

c. When your laptop dies, your ability to study decreases for every possible study combination. This results in lower productivity and therefore, a leftward shift of your PPF.



### Problem 5

5. Your niece is deciding whether or not to open a lemonade stand. She expects to sell 20 cups of lemonade for $1 per cup. She already made a sign that cost her $10 and will have $15 worth of additional costs for cups and lemonade mix if she decides to open the stand. If your niece decides to open the lemonade stand, how much profit will she earn? Should she open the lemonade stand? What kind of cost is the $10 spent on the lemonade stand sign?

### Solution 5

5.Her profit will be −$5. If she decides to open the lemonade stand, her revenue will be 20 \* $1 = $20. Her costs will be $15 for the cups and lemonade mix and $10 for the sign. So, her profits will be $20 − $10 − $15 = −$5. She should open the stand. If she decides to not open the stand, she will not receive any revenue. She will also not use any cups or lemonade mix, but she has already spent the money and made the sign, so her profits would be equal to −$10. In this case, she is taking a loss either way, but she would be better off opening the stand. Notice that when she opens the stand, she loses the $10 spent on the sign, and when she does not open the stand, she loses the $10 spent on the sign. That money is lost regardless of her current decision, so it is a sunk cost and should be disregarded when she makes her operating decisions. She should only consider the additional revenue she will receive by opening the stand ($20) and the additional costs ($15). In this case, she will be $5 better off by opening the stand than not opening it.

### Problem 6

6. Aliyah is preparing to expand her IT consulting company. The current market rate for IT professionals is $58,000 per year. Each employee she hires will also require a computer and equipment that costs $6,000 per employee annually. Hiring more employees means that Aliyah can provide consulting services to more clients each year. Each client Aliyah has will pay her $10,000 per year.

The number of clients Aliyah can take on is dependent on the number of workers she hires as shown in the accompanying table. What is the marginal cost and marginal benefit of hiring each worker? Using the Rational Rule to maximize her economic surplus, how many workers should Aliyah hire?

| **Number of workers** | **Clients per year** |
| --- | --- |
| 0 | 0 |
| 1 | 11 |
| 2 | 20 |
| 3 | 27 |
| 4 | 32 |

### Solution 6

6.The question facing Aliyah can be simplified to should she hire an additional worker or not. Marginal benefits and marginal costs are:

| **Number of workers** | **Clients per year** | **MB** | **MC** |
| --- | --- | --- | --- |
| 0 | 0 | - | - |
| 1 | 11 | $110,000 | $64,000 |
| 2 | 20 | $90,000 | $64,000 |
| 3 | 27 | $70,000 | $64,000 |
| 4 | 32 | $50,000 | $64,000 |

Aliyah should hire 3 workers. Hiring the fourth worker results in the marginal cost exceeding marginal benefit so she should stop at hiring the third worker.

### Problem 7

7. Neal is a coffee drinker. At the local coffee shop, the price of a cup of coffee is $3. Neal’s total benefits from drinking coffee is provided in the accompanying table. What is Neal’s marginal benefit of consuming each cup of coffee? How many cups should he consume each day?

| **Quantity of coffee (cups per day)** | **Total benefits** |
| --- | --- |
| 1 | $8 |
| 2 | $14 |
| 3 | $18 |
| 4 | $20 |
| 5 | $21 |

### Solution 7

7. Neal’s marginal benefit for each cup of coffee is:

| **Quantity of coffee (cups per day)** | **Total benefits** | **MB** |
| --- | --- | --- |
| 1 | $8 | $8 |
| 2 | $14 | $6 |
| 3 | $18 | $4 |
| 4 | $20 | $2 |
| 5 | $21 | $1 |

Neal should consume 3 cups of coffee. His first cup gives him a MB of $8 which is greater than his marginal cost of $3. The second cup will give him $6 of MB which is still greater than the marginal cost of $3. The same goes for the third cup, which gives him $4 of marginal benefit. Consuming the fourth cup gives him $2 of marginal benefit, which is less than what it costs him to purchase the cup of coffee. Neal should stop drinking coffee when he finishes his third cup.

### Problem 8

8. Consider your decision to read this textbook on economics. Identify which of the four core principles of economics is most relevant for the following aspects of that decision.

1. Reading this textbook will help establish a solid foundation for understanding concepts you will learn in more advanced economics courses.
2. Reading this textbook will require time and effort, but doing so will help you improve your grade in this course.
3. The time you will spend reading this textbook could instead be used to study for your chemistry exam.
4. Each extra page that you read and each practice problem that you complete will help you increase your understanding of the material.

### Solution 8

8. a. Interdependence Principle. This is an example of dependencies through time. Decisions that you make today, in this case the decision to read this textbook, will have implications for outcomes in the future, in this case your ability to better understand concepts you will be exposed to in future courses.

b. Cost-Benefit Principle. Ultimately, your decision to read this textbook will be determined by the benefits you receive and the costs you incur. The benefits of reading this textbook include a better understanding of the material. This will help you earn a better grade in this course but will also, perhaps more importantly, help you make better decisions in your everyday life. The costs of reading this book is that it will take time and effort on your part.

c. Opportunity Cost Principle. Reading this textbook will require time. The time you will spend could have been spent on other activities, such as studying for another exam or spending time with friends. Whenever you attempt to determine the costs of an action, you should always ask “or what?” In this case, you could spend time reading this textbook or—what else could you spend that time doing? The answer to that question will help you determine the opportunity cost incurred by reading this textbook.

d. Marginal Principle. The decision to read this textbook can be broken up into a “how many” question. How many pages should you read or practice problems should you do in order to provide you with a solid foundation in your understanding of economics principles?

### Problem 9

9. For each of the following, indicate how you might apply the four core principles of economics.

1. You are considering whether you should vote in the next election.
2. You watch a beautiful sunset from the back porch of your home.
3. Should you major in economics or philosophy?
4. Should you and your spouse purchase a second vehicle?

### Solution 9

9. a. You need to make a choice on whether you should vote or not. Ultimately, the decision to vote or not is a decision that involves determining the benefits associated with voting and the costs. Benefits of voting include having input into who is elected to office and the satisfaction you get from exercising your right to vote. There are also costs, including the time spent becoming informed about the candidates and issues, and the time costs associated with the act of voting itself. The time spent on these activities could have been spent on other activities, so there is an opportunity cost associated with voting.

b. Whenever you make a decision about how to use your time, there is an opportunity cost to consider. Ultimately, your decision whether to stop and watch the sunset is a cost-benefit decision. The benefit you receive is the joy you experience from watching a beautiful sunset. The cost is the benefit you are giving up by not using that time for another activity, or the opportunity cost of the time spent watching the sunset.

c. This decision involves a choice that has both benefits and costs. In order to make the best decision, you should think expansively about what those costs and benefits are for you, and then make the decision that provides the greatest economic surplus.

d. The decision to purchase the second vehicle should be determined based on the additional benefit you and your spouse receive from having a second vehicle and the opportunity cost associated with the purchase. Remember that the opportunity cost includes not just the price you pay for the car, but also the value of the next best thing you might have used that money for—such as saving for a vacation or to buy a home.