Recitation 1 Answer Key

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Week 1 (8/28-9/3): Core Principles of Economics

Recap of this week's most important concepts:

- Scarcity, trade-offs, incentives,
- Willingness to pay, willingness to accept, economic surplus, optimization
- Opportunity cost
  - Definition and formula (monetary value + forgone net benefit from next best alternative).
  - Ignore sunk costs! (or take them into account everywhere)
  - How to calculate opportunity cost, with 2 or more possible options (i.e. know how to identify *next best* alternative if more than one alternative)
  - Interpretation of opportunity cost: action should be taken if its benefit exceeds its opportunity cost.
- Rational principle: do something as long as marginal benefit exceeds marginal cost, up to the point where they are equal.

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1. Malcolm has just arrived in New York City for a well earned holiday but is given only three options of what to do by his wife Lucy. He can go see Hamilton ("boring!" thinks Malcolm) where he will have to pay $200 for a ticket, but if it was up to him he would only go if it was free. Alternatively he can go shopping with Lucy, where he knows he'll end up spending $200 but because Malcolm loves high-end fashion, he'll value his purchases at $500. Finally, he can stay in his hotel if he promises to work on his memoir (which doesn't come at any financial cost to him). He chooses this last option. What is the opportunity cost of his decision?

   a. $0
   b. $100
   c. $300
   d. $400

e. $500

Solution: c.

	Benefit	Cost
Hamilton	$0	$200
Shopping	$500	$200
Hotel room	No information	$0

Opportunity cost of staying in hotel room
= direct cost of staying in hotel room + net benefit of next best alternative.

Notice that here there are two alternatives to staying in the hotel room: seeing Hamilton and shopping. We only consider the next best alternative (the one that generates the highest net benefit): Hamilton generates a net benefit of $\$0 - \$200 = -\$200$ and going shopping generates a net benefit of $\$500 - \$200 = \$300$, so the next best alternative to staying in the hotel room is going shopping – therefore we ignore Hamilton.

Opportunity cost of staying in hotel room
= direct cost of staying in hotel room + net benefit of going shopping
$= \$0 - +300$
$= \$300.$

2. Brittany bought a sweater from an online retailer for $40. She was disappointed when the package arrived last week because the sweater turned out to be too small for her. She could return the sweater and receive a refund, less a $10 shipping fee. Another option is to sell the sweater to her friend Jessica, who offered to purchase it for $25. What is the opportunity cost of selling the sweater to Jessica?

   a. $10
   b. $15
   c. $25
   d. $30
   e. $40

   Solution: d. If she returns it, her benefit is $30. So that is what she gives up if instead she sells the sweater to Jessica.

3. Lucy was planning on going to New York City for the weekend to see a Broadway show. She bought a $130 non-refundable train ticket, as well as a $40 ticket to the show, which she is able to resell for half of the face value. However, she just found out that the outdoor club is going on a hiking trip the same weekend as the show. The hiking trip costs $50, all-inclusive, and she values it at $100. What is her opportunity cost of going to New York?

   a. $220

   b. $90

   c. $70

   d. $170

   Solution: c.

	Benefit	Cost
New York trip	No information	$130 + $40
Hiking trip	$20 + $100	$130 + $40 + $50

   Note that the $130 spent on the train ticket is a sunk cost since it is not refundable, so it is spent whether Lucy goes to New York or not. We have to take it into account in both rows costs. But it would be equivalent to ignore it both rows. Similarly, we are taking the $40 ticket to the Broadway show in both rows costs, but if she doesn't go to New York she is able to resell the Broadway ticket for half the face value, so we add $20 to the benefit of going on the hiking trip.

$$\begin{aligned}&\text{Opportunity cost of New York trip}\\&= \text{ direct cost of New York trip } + \text{ net benefit of hiking trip}\\&= \$130 + \$40 + (\$20 + \$100) - (\$130 + \$40 + \$50)\\&= \$70\end{aligned}$$

   .

The next questions are for your own practice.

4. Minshen just spent $5 on a refundable movie ticket before his friend gave him a free ticket to the Philadelphia Orchestra concert. Going to the movies or to the concert are his only options. Going to the movies is worth $7 to Minshen, while going to the Philadelphia orchestra concert is worth $10. The opportunity cost of going to the Philadelphia Orchestra concert is

   a. $0

   b. $2

c. \$5

d. \$7

e. \$10

f. \$12

Solution: b.

	Benefit	Cost
Movies	\$7	\$5
Orchestra	\$10	\$0

Here the \$5 spent on the movie ticket is refundable, so can consider it as a regular cost (NOT a sunk cost) and only include it in the first row cost.

$$\begin{aligned}&\text{Opportunity cost of concert}\\ &= \text{ direct cost of concert } + \text{ net benefit of next best alternative}\\ &= \$0 + \$7 - \$5\\ &= \$2\end{aligned}$$

NOTE: If we decide to consider the \$5 movie ticket as a sunk cost, then we must include it in both rows costs, as well as in the benefit of the concert:

	Benefit	Cost
Movies	\$7	\$5
Orchestra	\$10+\$5	\$5

In that case the opportunit cost of the concert is calculated as follows:

$$\begin{aligned}&\text{Opportunity cost of concert}\\ &= \$5 + \$7 - \$5 = \$7\end{aligned}$$

Therefore, d. could also be considered a correct answer.

Note however that the difference between benefit and cost (and the decision to go to the concert) is NOT affected by this change:

- In the first solution, the benefit of the concert is \$10 and the opportunity cost is \$2, so the diffefence is \$8
- In the second solution, the benefit of the concert is \$15 and the opportunity cost is \$7, so the diffefence is also \$8

If the question was "should Minshen go to the concert?", we would compare the opportunity cost of the concert with the benefit of the concert and conclude that since benefit $>$ cost he should go to the concert. Equivalently, if the question was "should Minshen go to the movies?", we would compare the opportunity cost of the movies with

the benefit of the movies. Regardless of the solution used above, the opportunity cost of the movies would be \$15 (and the benefit is \$7). Since benefit $<$ cost he should NOT go to the movies (which is consistent with the fact that he should go to the concert).

5. Mary bought a refundable movie ticket for Saturday night, which cost her \$10. But she just received an invitation to an Among Us Game Night from her college house, scheduled at the same time as the movie. If she stays in her dorm and plays the Among Us game online, she will order pizza, which will cost her \$20. If instead she goes to the movies, she will buy popcorn for \$5. She loves Among Us and values the game night at \$40. What is Mary's opportunity cost of going to the movies?

   a. \$15
   b. \$25
   c. \$35
   d. \$45

   Solution: c. Her opportunity cost of going to the movies is the direct cost plus the net benefit of the next best alternative (playing Among Us). The direct cost of going to the movies is the cost of popcorn (\$5) plus the cost of the ticket (\$10), since it is refundable, so it is \$15. The net benefit of playing Among Us is \$40-\$20=\$20. So the opportunity cost of going to the movies is \$35. Notice that we could also consider the \$10 movie ticket as a cost for both options (she has bought it already), then we must also add \$10 to the benefit of playing Among Us, since she will get a refund if she doesn't go to to the movies. In that case, her net benefit of playing Among Us is (\$40+\$10)-(\$20+\$10)=\$20. The opportunity cost of going to the movies is still \$35.

6. Carolyn needs to provide care for her ailing parents. She can either quit her job and move in to their house to take care full time, or put them in a nursing home and keep her current job, which pays \$130,000. The nursing home would cost her \$60,000. She knows her parents would not like the nursing home and she values the benefit of not sending them there at \$50,000. Is it a rational decision to quit her job and take care of her parents, and why?

   a. No, because the benefit of that decision is \$50,000 and its opportunity cost is \$60,000.
   b. No, because the benefit of that decision is \$50,000 and its opportunity cost is \$70,000.
   c. No, because the benefit of that decision is \$50,000 and its opportunity cost \$130,000.

d. No, because the benefit of that decision is \$50,000 and its opportunity cost \$190,000.

Solution: b. Solution