

Northwestern Economics Tournament

Sample Power Round

TEAM NAME: _____

SCHOOL: _____

There are 10 questions in this packet. You have 1 hour to complete the exam. When the moderator calls time, please put your pencil down and pass the answer sheet and this packet to the aisles for collection.

No calculators, notes, or any other helping tools may be used during the exam.

Use available space in the packet for scratch work. Should you need more scratch paper, we'll be happy to provide with you more.

One of the 10 questions will be selected, before the exam, as the tiebreaker question. Among teams that tie, whichever team collects the most points on this question will be declared the winner. In the event that there is still a tie afterwards, a final tiebreaker quiz-bowl style question will be administered.

Place all answers on the black space under the questions.

Good luck!

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SET A

1. Suppose there is a market for mugs, consisting of 8 people from A to H. The value of one mug to each person is listed in the table below. In addition, each person only wants at most one mug, which means each values the second mug at a price of \$0. The suppliers in the market are persons A to D, and each has one mug to sell. Please graph the the market supply and demand curves and show the market price of mugs. (In this case the supply and demand curves should both be discrete). (2 points)

Person	A	B	C	D	E	F	G	H
Value of mug	4	11	7	2	13	6	9	4

2. Now suppose people value the things they own more than the things they don't own (which is a common psychological effect). Consider the previous table as their value of a mug when they don't own it. Suppose that people always value their mug more by \$1 than when they don't own it. Graph the new supply and demand curves in the market, and find the new market price for mugs. (The curves should still be discrete). (3 points)

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3. Now forget about the psychological effect in part (2). Suppose people's value of a mug has a uniform distribution on $[0, 20]$, which means any number between 0 and 20 has the same possibility of occurrence (so the average of people's value of a mug is \$10). Still we are assuming people only want at most 1 mug. Now we randomly select 100 people, and give 50 of them each a mug, and the rest each 10 dollars. We then let these 100 people engage in mug trade. Derive the expected amount of mugs traded in the market and explain why. (5 points)

4. Finally, let's again consider the psychological effect in part (2), but instead of \$1, people now value the mugs they own by \$2 more. In the same scenario under part (3), find the new expected amount of mugs traded in the market of 100 randomly selected people and explain why. (**Note:** The distribution of people's value of a mug in part (3) is for if they don't own a mug.) (3 points)

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SET B

1. Draw a graph representing an unregulated monopolistic firm. In your graph, label.
 - a. The demand, marginal revenue, marginal cost, and average total cost curves. (4 points)
 - b. The profit-maximizing quantity and price. (2 points)
 - c. The areas of economic profit and deadweight loss. (2 points)

2. Suppose now that the monopolistic firm can practice perfect price discrimination. Redraw the graph above and label.
 - a. The demand, marginal revenue, marginal cost, and average total cost curves. (4 points)
 - b. The profit-maximizing quantity. (1 point)
 - c. The area of economic profit. (1 point)

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SET C

Suppose two people A and B are on two different islands. A's island is surrounded by rigid cliffs but has a lot of coconut palms, while B's island is covered by desert but has shallow water teeming with fish. A and B can both work for 6 hours per day. It takes A 90 minutes to catch a fish and 20 minutes to gather a coconut, while it takes B 30 minutes to catch a fish and 60 minutes to gather a coconut.

1. Draw the production possibility frontiers (PPFs) of the two men on the same diagram, with daily production of fish on the vertical axis and of coconuts on the horizontal axis. What is A's opportunity cost of a coconut in terms of fish? What is B's opportunity cost of a fish in terms of coconuts? (4 points)

2. Initially A and B don't know of each other's existence, so there is no trade. According to their own taste of fish and coconuts, unfortunately, A decides to spend all his time gathering fish and B decides to spend all his time gathering coconuts. How many fish will A consume each day? How many coconuts will B consume each day? (2 points)

3. One day they spot each other on their own islands, and they decide that it's a good idea to engage in trade. Now they specialize in producing what they are more efficient at and trade fish for coconuts one-for-one. Is it possible for them to be both better off after this trade? If so, describe a trade that makes them both better off. If not, explain why. (2 points)

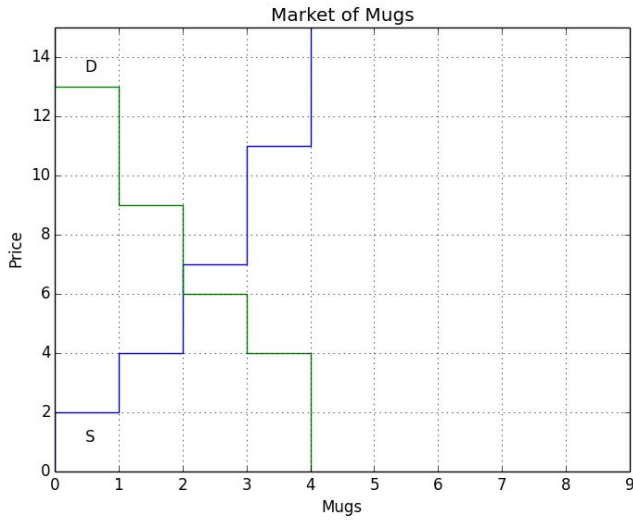
4. Evaluate the following statement: if A is more efficient than B in both gathering coconuts and catching fish, A should not trade with B. (3 points)

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Answer Key

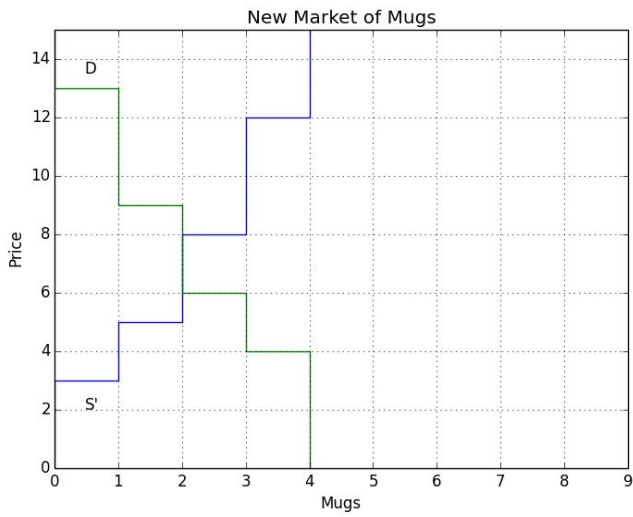
SET A

1.



The price can be anything between \$6 and \$7.

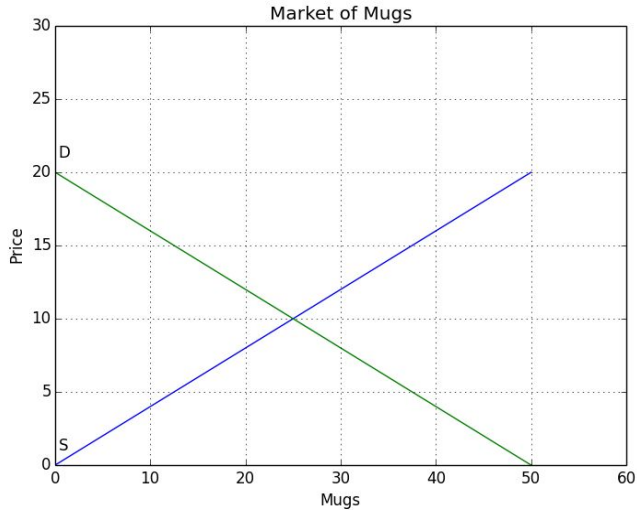
2.



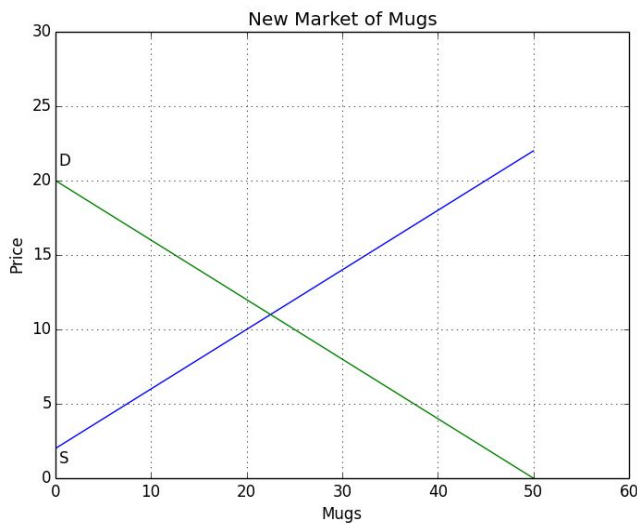
The supply curve shifts up by \$1, and the price can be anything between \$6 and \$8.

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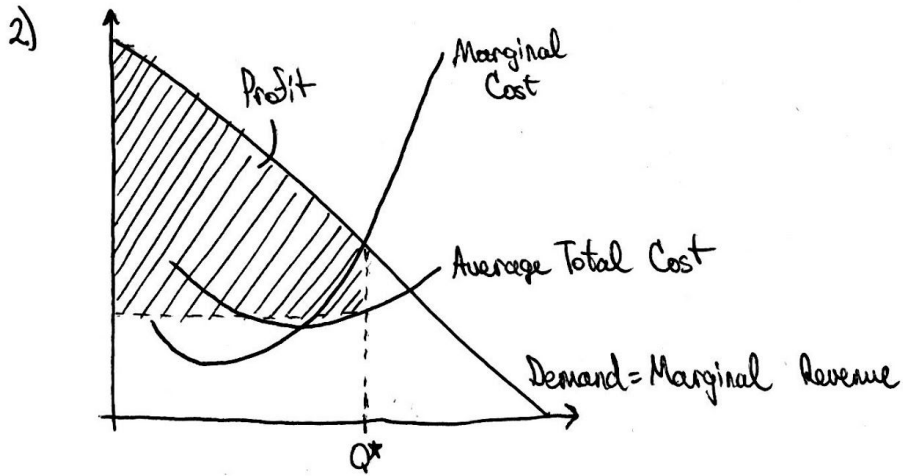
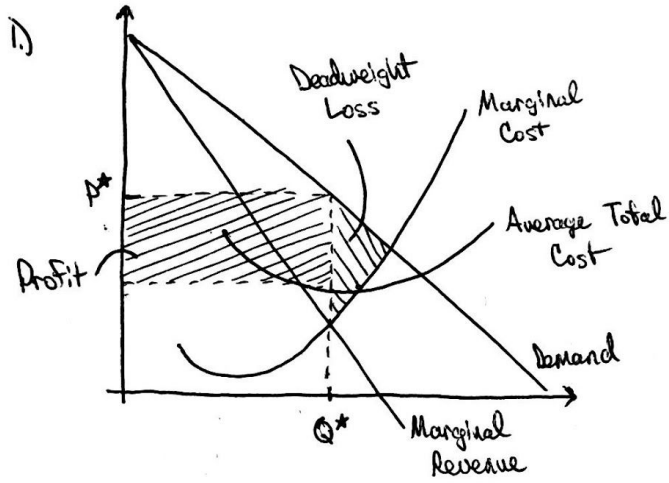
3. 25, since on average 25 people who have a mug will value their mugs below \$10, and 25 people who have \$10 value mugs above \$10, these people will engage in trade so the average amount of mugs traded is 25. You can also solve the problem by plotting out the average supply and demand curve (S: $P = 0.4Q$, D: $P = 20 - 0.4Q$). They meet at 25.



4. The new distribution of value of a mug for those people who own a mug is a uniform distribution on $[22, 2]$, we can plot the new supply curve just by shifting up the original supply curve by \$2 (S: $P = 0.4Q + 2$, D: $P = 20 - 0.4Q$). Solve for the equilibrium quantity we get 22.5.



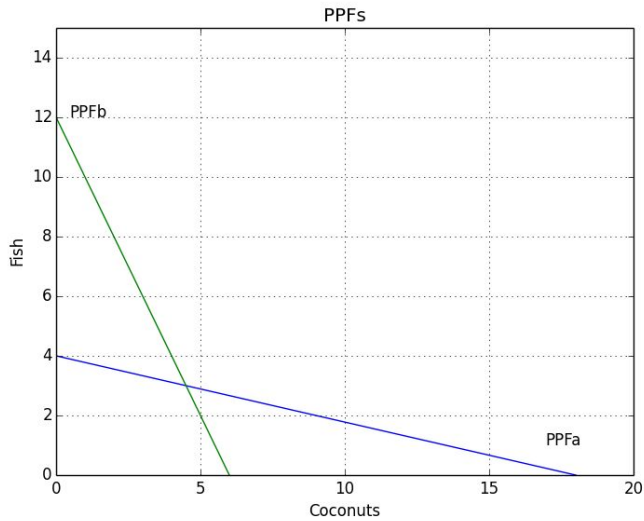
SET B



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SET C

1. A's opportunity cost of a coconut is $\frac{2}{9}$ fish. B's opportunity cost of a fish is $\frac{1}{2}$ coconut.



2. A will consume 4 fish each day. B will consume 6 coconuts each day.

3. Now A can produce 18 coconuts and B can produce 12 fish each day. Suppose A trade 6 coconuts for 6 fish from B. A now can consume 6 fish and 12 coconuts and B can consume 6 fish and 6 coconuts. They are both better off.

4. The statement is wrong. Clue: what matters is the comparative advantage instead of absolute advantage, for example, what if in this scenario A's opportunity cost of a fish in terms of coconuts is higher than B's?