

ECON 107

First Midterm

Be sure to show your work for all answers, even if the work is simple.
This exam will last 100 minutes.

1. (17 points) **Honor Statement:** Please read and sign the following statement:

I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person. I will also neither help others nor use a calculator or other electronic aid for calculation.

Name and Surname: _____

Student ID: _____

Signature: _____

Remark 1 Please notice that your cell phone must be face down on your desk during the exam. You can be asked to leave if you violate this rule.

2. (18 points total) About *Pareto Efficiency*. Remember that an *allocation* (denoted A or B) is a list of goods and services for every person in the economy.

- (a) (6 points) Define *Pareto Dominance*.

Solution 2 Allocation A Pareto Dominates (or Pareto improves on) allocation B if everyone likes A better and some strictly prefer A .

- (b) (6 points) Define *Pareto Efficiency*.

Solution 3 A is Pareto Efficient if there is no feasible B that Pareto dominates it

A is Pareto Efficient if any change that makes some better off makes others strictly worse off.

- (c) (6 points) It is fairly clear that if you base welfare on utility or happiness that *Pareto efficiency* is a desirable characteristic. Explain why we might not want to base welfare solely on happiness, and give an example that shows most governments do not base welfare solely on happiness.

Solution 4 Of course there can be varied answers here, but I think a simple example will answer both questions.

Drugs, many drugs are illegal even though they bring happiness to the people who use them (those people choose to take them, after all).

Governments do not follow the "legalize and regulate" strategy.

Thus it is clear there are other welfare criteria, and that all governments agree with this approach.

3. (6 points) So when I was having tea with my friend the bread baker and I mentioned that even after adjusting for inflation, income was going to rise 10% next year. He said "Well, that's bad news." Why is he upset?

Solution 5 Bread is an inferior good, so if the income of the average Turk is going up bread consumption will go down. Thus while the average real income will grow 10%, my poor friend's income will probably fall.

4. (16 total points) For each of the following changes, state whether they would impact the demand curve for electric cars in Turkey or only the quantity bought. Also state whether they would increase or decrease either the demand curve or the quantity bought. Briefly explain your answer.

Remark 6 As mentioned in class, if you didn't know the difference between a change in quantity demanded and a shift in the demand curve you should have asked. So many students wrote "both" as their answer, and a wrong plus a right is a wrong. I tried to give some partial credit, but I sometimes gave more for a well argued wrong answer.

- (a) (4 points) An increase of the real income of Turks. ("real" means after we control for inflation.)

Solution 7 Since automobiles are a normal good, this will shift the demand curve up.

- (b) (4 points) A subsidy decreasing the price of electric cars bought in Turkey.

Solution 8 This will increase the quantity demanded, but will not shift the demand curve.

- (c) (4 points) A subsidy decreasing the price of gasoline cars bought in Turkey.

Solution 9 This is decreasing the price of a close substitute, which should result in the demand curve for electric cars shifting in, decreasing demand.

- (d) (4 points) The Turkish government installing electric charging stations all over in Turkey. (Places where you can charge an electric car.)

Solution 10 Part of the cost of an electric car is trying to find charging stations. This will make it easier to do that and thus reduce the day to day cost of electric cars, resulting in an increase in the demand curve.

a	b	c	d	P^*	Q^*
27	$\frac{1}{2}$	13	2	16	19
25	$\frac{1}{2}$	2	1	18	16
27	$\frac{1}{4}$	12	3	12	24
21	$\frac{1}{3}$	7	1	21	14

5. (16 points total) In a given market the supply curve is given by $Q_s = -c + dP_s$ and the demand curve is given by $Q_d = a - bP_d$ where $Q_s > 0$ is the quantity supplied, $Q_d > 0$ is the quantity demanded, $P_s > 0$ is the per-unit price the sellers receive and $P_d > 0$ is the per-unit price the buyers pay.

(a) (8 points) In a competitive equilibrium what do we know about the relationship between P_s , P_d , Q_d , and Q_s ? Explain why.

Solution 11 We know that $P_s = P_d$ because otherwise would state they cannot agree at what price to trade at. Likewise $Q_d = Q_s$ because otherwise either demanders would offer to pay more or suppliers would offer to charge less.

(b) (8 points) Find the competitive equilibrium in this economy.

$$\begin{aligned} Q &= a - bP \\ Q &= -c + dP \end{aligned}$$

$$\begin{aligned} a - bP &= -c + dP \\ P &= \frac{a + c}{b + d} \end{aligned}$$

$$\begin{aligned} Q &= a - b \left(\frac{a + c}{b + d} \right) = a - a \frac{b}{b + d} - b \frac{c}{b + d} \\ &= \frac{ad - bc}{b + d} \end{aligned}$$

$$\begin{aligned} Q &= -c + d \left(\frac{a + c}{b + d} \right) = a \frac{d}{b + d} - c + c \frac{d}{b + d} \\ &= \frac{ad - bc}{b + d} \end{aligned}$$

Remark 12 Fortunately I don't know who, but some student thought that since they had no idea how to find an equilibrium they should write a long paragraph about the second hand car market. I tried to control my disappointment, and I hope you are smart enough to know this will just make me very upset in the future.

6. (12 points) My friend took me out for drinks last week to celebrate him buying the factory he was renting. He paid cash so he also has no debt. He happily said "I can now operate my factory for free." Because he was so happy, I gritted my teeth and did not tell him how wrong he was. What should I have told him? Be sure to use the appropriate technical terms and explain how he should estimate this cost.

Solution 13 *If he did not use the factory he could rent it out and earn income. Thus the opportunity cost of using the factory is not zero. At least for the first year or two this cost can easily be estimated as the amount he would have paid in rent. After that he might want to look at the newspapers, talk to colleagues in the same industry, in order to estimate the appropriate amount.*

z	x	ε_d
12	2	-2
15	1	-1
16	3	-3
28	4	-4

7. (7 points total) For empirical work, a popular form for the demand curve is:

$$\ln Q = \alpha - \beta \ln P$$

with this demand curve one can show that $\frac{dQ}{dP} = -\beta \frac{Q}{P}$. If the demand curve is:

$$\ln Q = z - x \ln P,$$

find the own price elasticity of demand when $(P, Q) = (10, 5)$, $(3, 8)$, and $(15, 12)$.

Remark 14 *I must admit to an error in my question. $\frac{dQ}{dP} = \beta \frac{Q}{P}$, the negative sign is inappropriate. I was thinking of β as the number I would enter—which of course would be positive. I had never intended to grade based on whether it was negative or positive.*

Solution 15 *Everyone should know that the general form for the own price elasticity of demand is:*

$$\varepsilon_d = \frac{dQ}{dP} \frac{P}{Q}$$

when I plug in the derivative above:

$$\varepsilon_d = -\beta \frac{Q}{P} \frac{P}{Q} = -\beta$$

Thus the answer is always $-x$ (or x depending on which sign you work with.)

Of course I could have freaked out unnecessarily when I saw a general formula and had to apply it to a specific case, but that would have cost me points.

I could also have figured out $\frac{dQ}{dP}$ for each of the three cases, and then figured out ε_d for each case, but that would have cost me time.

By working in the general case, my problem became a lot easier. These are called constant elasticity demand curves, by the way.

8. (8 points) A common misconception about international trade is that large countries have no reason to trade with small countries. Explain why this is wrong, making sure to include the technical term for why countries should trade. Discuss whether or not this explanation also explains how I, in particular, can trade with Turkey.

Solution 16 *A large country will usually have absolute advantage over a small one, but this does not affect trade at all. Trade depends on the comparative advantage, or the opportunity cost of producing each good. If one country has a comparative advantage relative to another, it should specialize and trade for the goods that have a higher opportunity cost of producing themselves.*

In particular, I have been trained to research and teach Economics. This means that my opportunity cost of producing that is the lowest possible, and I can trade with Turkey because it has a relatively higher opportunity cost of producing this good. (Please note I am not claiming many Turks can do my job, its just that I and they have a specialization, which enables trade.)