ECON 107
Second Midterm

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

1. *(20 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:

   _

2. *(8 points)* Suicide bombers state that it is worth dying if they can kill a bunch of civilians. These people are not rational. Is this true or false? Most of the points will be for explaining your reasoning.

   Solution 1 *False. I would agree that these people are not sensible, but if that is how they feel then so be it. It is not our job to judge other people's choices.*

   I would like to highlight three answers given by your classmates, which are better than mine.

   (a) *False, because they are rational—not logical. Because if they refuse to do that their leader will probably kill them anyway, and because of their beliefs. If they do that they think they are going to heaven in their belief system. This is extremely wrong but as we said, we must assume that decision makers are rational and they are doing the best decision for themselves according to their beliefs and information. But they are not logical and their dying is extremely wrong.*

   (b) *Rationality means making optimal decisions. Yes they are rational but it does not make sense, they are not sensible.*

   (c) *It is important to understand that of course killing a bunch of civilians is not cool, the suicide bomber still has their own motives. The bomber is still rational because they thought that the best way to achieve whatever outcome they want is to do this act of terror.*

3. *(12 points total)* About the long run.

   (a) *(4 points)* Define the long run in economic theory.

Solution 2 *The long run is the point in time where all inputs are completely flexible.*

(b) *(8 points)* As I have repeated again and again, the long run never happens, so why do we want to find long run average cost?

Solution 3 *Because the long run is essentially the goal of every firm in the industry. Adapting the technology, capital, etcetera that minimizes long run average cost will be the underlying goal of all firms, their target. This will allow us to predict how the industry will change with time.*

4. *(12 points)* Your mom is kind of a hard nose about money. You told her you need a new pair of pants, so she went to the Decathlon website, found out how much a new pair of pants would cost, and gave you 2500TL in cash. You know how she is, so you know if you buy anything else she just won't give you any money for several months—and most certainly won't buy you those pants. However now you are out shopping with your friends, and several other options have come up. Your friends want to go to a fancy restaurant for lunch, you found a shirt that is absolutely to die for, and an earring that would be sure to attract the attention of that special someone. Being a good economics student, you have constructed the following table:

Good	Marginal Utility	Cost
Pants	W	2400TL
Restaurant	X	1500TL
Shirt	Y	2100TL
Earring	Z	1800TL

Good	Marginal Utility	Cost	BfB	Choice
Pants	4800	2400TL	$\frac{4800}{2400} = 2.0$	Pants
Restaurant	2000	1500TL	$\frac{2000}{1500} = 1.333\,3$	
Shirt	3000	2100TL	$\frac{3000}{2100} = 1.428\,6$	
Earring	3500	1800TL	$\frac{3500}{1800} = 1.944\,4$	

Good	Marginal Utility	Cost	BfB	Choice
Pants	4800	2400TL	$\frac{4800}{2400} = 2.0$	
Restaurant	4500	1500TL	$\frac{4500}{1500} = 3$	Restaurant
Shirt	3000	2100TL	$\frac{3000}{2100} = 1.428\,6$	
Earring	4000	1800TL	$\frac{4000}{1800} = \frac{20}{9} = 2.222\,2$	

Good	Marginal Utility	Cost	BfB	Choice
Pants	4800	2400TL	$\frac{4800}{2400} = 2.0$	
Restaurant	2000	1500TL	$\frac{2000}{1500} = 1.333\,3$	
Shirt	4400	2100TL	$\frac{4400}{2100} = 2.095\,2$	Shirt
Earring	3600	1800TL	$\frac{3600}{1800} = 2.0$	

Good	Marginal Utility	Cost	BfB	Choice
Pants	4800	2400TL	$\frac{4800}{2400} = 2.0$	
Restaurant	2000	1500TL	$\frac{2000}{1500} = 1.333\,3$	
Shirt	4500	2100TL	$\frac{4500}{2100} = \frac{15}{7} = 2.142\,9$	
Earring	4500	1800TL	$\frac{4500}{1800} = \frac{5}{2} = 2.5$	Earring

which should you buy and why? As always most of the points will be for the explanation.

Solution 4 *What matters is the "bang for the buck" or*

$$\frac{MU_x}{p_x}$$

thus one should choose the maximum of:

$$\max\left(\frac{W}{2400}, \frac{X}{1500}, \frac{Y}{2100}, \frac{Z}{1800}\right)$$

and for each variation of the midterm the answer was different.

5. *(6 points)* Your friend just happily told you that her business will only loose 15M TL this year. Why doesn't she shut down?

   Solution 5 *Because she obviously has sunk costs that are more than 15M TL. If she continues operation she can earn some money to pay this off, if she shuts down her debt will be higher.*

   Many of you answered with "she will make it up next year" or "she made a lot in the past." While this is often true in business it is only a possibility, the bottom line is that if she shut down she would have more than 15M TL in debt, by operating she has ***only*** *15M TL in debt.*

6. *(30 points total)* You are trying to decide whether or not to work on developing a patent. You know that the demand for the resulting good would be as follows:

value (v_i)	customers with this value	# of units sold	Total Revenue	R^*	V^*	E^*
10	5	5	50		130	
6	3	8	48			
5	3	11	55			
4	2	13	52			
3	7	20	60	60 ($p = 3$)		
2	9	29	58			18

value (v_i)	customers with this value	# of units sold	Total Revenue	R^*	V^*	E^*
10	5	5	50		142	
5	6	11	55			
4	1	12	48			
3	2	14	42			
2	16	30	60	60 ($p = 2$)		
1	20	50	50			20

value (v_i)	customers with this value	# of units sold	Total Revenue	R^*	V^*	E^*
8	6	6	48	140	164	
6	5	11	66			
5	2	13	65			
4	3	16	64			
2	20	36	72	72 ($p = 2$)		
1	24	60	60			24

value (v_i)	customers with this value	# of units sold	Total Revenue	R^*	V^*	E^*
7	7	7	49		153	
6	3	10	60			
5	3	13	65			
3	7	20	60			
2	15	35	70	70($p = 2$)		
1	20	55	55			20

(a) *(5 points)* In which class of goods is a patent? Is it rival or non-rival? Excludable or not? Give a couple of other examples of goods in this class.

Solution 6 *A patent is a* club good*, it is non-rival and excludable. Other examples are movies, toll roads, books, and etcetera.*

(b) *(3 points)* What is the total value of this patent?

$$V = \Sigma_{i=1}^{n} v_i = v_1 n_1 + v_2 n_2 + v_3 n_3 + v_4 n_4 + v_5 n_5 + v_6 n_6$$

where $(v_1, v_2, v_3, v_4, v_5, v_6)$ are the six values in your problem and $(n_1, n_2, n_3, n_4, n_5, n_6)$ are the number of people with that value. The total for each variation is above.

(c) *(10 points)* Complete the following table, you should assume that a customer will buy unless the price is strictly higher than their value.

value (v_i)	Number of units sold if $p = v_i$	Revenue if $p = v_i$

What is the revenue maximizing price?

Solution 7 *The solutions are above for each variation.*

(d) *(8 points)* Define and explain the two inefficiencies with patents, giving numeric explanations from this problem.

Solution 8 *Underprovision: since the optimal revenue (R^*) is lower than the total value (V^*) if the expected cost of innovation is $R^* < C < V^*$ then this good will not be provided when it should be.*

Exclusion: since this good is non-rival everyone who wants to consume it should, resulting in unnecessary exclusion. The quantification of this exclusion (E^*) is listed for each variation above.

(e) *(4 points)* Again (using this problem) explain how making one inefficiency better will make the other one worse.

Solution 9 *If we lower the price it will drive exclusion to zero, but it will decrease the revenue and thus underprovision.*

7. *(12 points total)* About *rationality*

(a) *(6 points)* Define what it means when we assume decision makers are rational.

Solution 10 *The simplest definition is that they optimize, to be more precise given their information and beliefs they make the best choice for themselves at all times.*

(b) *(4 points)* Why is it important for all social scientists to assume their subjects are rational?

Solution 11 *In the simplest terms? Humility. It is the height of arrogance to assume that the people you are studying—whose life might be on the line if they make a mistake—are less sensible than you—an academic living in an ivory tower—about the decisions they make. It will also lead to mistakes, which will lead to embarrassment on your part.*

(c) *(2 points)* Give an example where not accepting people are rational could lead to bad policy.

Solution 12 *As I stated, I expected essentially nobody to get this right. Thus let me give two answers.*

The first is dear to my heart. It has been a long accepted belief in the United States that slavery was an antiquated production system, that indeed the Northern (anti-slave) states were doing the Southern (slave) states a favor by abolishing slavery. Naturally, of course, the South disagreed and the only possible outcome was war.

Consider the different approach taken in England, there they paid the slave owners for their slaves and slavery was abolished without any loss of life–though the UK government took on a debt that they have only recently repaid. This approach made no sense in the United States because of our beliefs.

Of course given the abuse of former slaves after their freedom, it is clear they should have been given a larger payment than the slave owners, but perhaps the abuse would not have been as bad if the Southerners had (mostly) voluntarily given up their slaves. But probably it still would have been, racism is an ugly word.

Let me make clear that this belief is deeply held by many Americans to this day. It was with great shock and disgust that I read "Time on the Cross: The Economics of American Negro Slavery" by Fogel and Engerman. This work merely summarized and expanded on the work of Economic Historians about how productive and profitable slavery was. Though I must admit the recognition that perhaps the modern economy would be stronger with slavery still shocks me to the core.

The second example is from the professor who first taught me the empirical importance of rationality. During the development of Southeast Asia at first they could not get enough workers for their factories, even though they were offering a better living than the farming most of the pool of workers were doing. The conclusion was that the rural folk simply were not motivated by money, and therefore development would have to rely on the urban workforce. Fortunately, however, someone went against this wisdom and located a factory in the countryside—where these people would not have to give up farming to take advantage of the opportunity. The result was a resounding success.

It was not that they did not want more money, it was that the amount offered was not sufficient for them to relocate to the cities and take the risk on a job they knew nothing about.