

Prelim Microeconomics

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Some ground rules

The objective of our tutorials is to introduce you to the scope and purpose of current microeconomic analysis and provide you with the basic tools required to understand later courses. Additionally, we will examine how these tools can be applied to microeconomic policy issues.

By the end of this course, you should be able to understand and clearly explain the tools, use the tools to analyse simple problems, and discuss the methodology.

We will meet 8 times this term for tutorials (details below - we might meet more next term).

For all tutorials, you will do the problem sets. For some, you might be required to write a short essay. Please type the essays but do not omit diagrams or mathematical notation. Neatly draw diagrams by hand (if necessary) and do *not* paste them from the textbooks.

All work must be handed in at Keble lodge or emailed to me by 7pm the Tuesday before the tutorial *otherwise it will not be marked and you will be barred from the subsequent tutorial.*

All of your work must be clear and well-presented. In general, your approach to economics questions and maths problems should be to go beyond the minimum required by the question, providing relevant comments, interpretation and explanation for your answers.

Every week, in addition to the problem sets, you should read the appropriate chapters from the textbooks and take notes. We won't have time in the tutorial to cover everything you need to know. It is your responsibility to ensure that you cover everything. If there are any particular points in the lectures or readings that you don't understand, please ask me to explain. If possible, email me before the tutorial with anything you are having trouble with.

I expect you to attend *all* lectures given for your courses. Our tutorials will be strongly related to what is covered by the course lecturers.

Texts

There are several relevant textbooks for this course; I will be primarily working out of Varian's *Intermediate Microeconomics: A Modern Approach*, Norton. This is the main text for the course and you might want to consider purchasing a copy. From what I understand, it is not essential that you use the most current edition (I will be using the 7th edition). There are several alternatives to Varian that you might want to consider:

Perloff, J. *Microeconomics: Theory and Applications with Calculus*, Pearson.

Morgan, W. Katz, L. and Rosen, H.S. *Microeconomics*, McGraw Hill.

If you opt for one of the alternatives (or another edition of Varian), please make sure you are reading the relevant chapters. For students who wish to see more advanced material, you might want to look at:

Kreps, D., *A Course in Microeconomic Theory*, Harvester Wheatsheaf.

Varian, H.R., *Microeconomic Analysis*, Norton.

For the mathematics component of the course, we will be working from the [Maths Workbook](#). You can find it on the Department of Economics intranet. For more resources on mathematics, you might want to consider Ian Jacques' *Mathematics for Economics and Business* or Anthony and Biggs *Mathematics for Economics and Finance*.

Tutorials will take place every Thursday. Let me know if your tutorial time does not work ASAP.

Please feel free to contact me by email if you have any questions.

Week	Topic	Maths	Varian	Room
MT1	Introduction, Consumer Theory	Ch. 1-2	Ch. 1-3	Stafford Crane
MT2	Utility, Choice, and Demand	–	Ch. 4-6	Gibbs
MT3	Price changes, Labour Supply, Revealed Preferences	Ch. 3	Ch. 6-9	Gibbs
MT4	Present Value and Intertemporal Choice; Markets and Welfare	Ch. 4-5	Ch. 10, 14-16	Gibbs
MT5	Differentiation; Firms: Production and Costs	Ch. 5-6	Ch. 18-21	Gibbs
MT6	Perfect Competition and Monopoly	–	Ch. 15, 22-24	Stafford Crane
MT7	Partial differentiation and Optimisation	Ch. 7-8	Ch. 5A, 6A	Stafford Crane
MT8	Market Power: Monopoly, Monopsony, Oligopoly	Ch. 9-10	Ch. 25-29	Jean Robinson
HT1	General Equilibrium and Externalities	Ch. 11	Ch. 31-34	tbd

Group	Time	Members
1	11am-noon	
2	2pm - 3pm	
3	4pm - 5pm	

Week 1

Discussion questions

For the following terms, please prepare: (i) a non-technical explanation of its role in theoretical and applied economics, (ii) simple examples of how it might be used, and (iii) an outline of any conceptual or practical difficulties with the concept:

- Optimising behaviour;
- Equilibrium;
- Heterogeneity.

I do not expect any more than about half a page on each topic and you do *not* need to hand this in in advance of the tutorial (I will collect them in the tutorial). In the tutorial, you will be called on to lead a short discussion on one or more topics.

Problem set

1. (Katz and Rosen) An article about the market for marijuana made the following three observations:

- a) in 1991, the price was \$ 80 per ounce, several years earlier the price was \$ 30 per ounce.
- b) By 1991, marijuana smoking was no longer in vogue: “health concerns ...have risen above the desire to get giddy”
- c) “Relentless police pressure had turned marijuana into a scarce commodity”.

Draw a set of supply and demand curves that are capable of illustrating these observations.

2. Draw indifference curves to illustrate each of the following statements, commenting on the nature of preferences and on the marginal rate of substitution in each case:
 - a) I like Coke and Pepsi, and I don't care which I drink - I can't tell them apart.
 - b) I love Coke but hate Pepsi.
 - c) I love Pepsi but have no feelings one way or the other about Coke.
 - d) I always have milk in my coffee, but I never drink milk alone.
 - e) I like tea and coffee, but too much of either stops me sleeping.
3. A household has a weekly disposable income of £100, and consumes only sausages and potatoes. Sausages cost £4 per kg, and potatoes cost £2 per kg. The government, which is concerned about the household's diet, provides a free weekly allocation of 5kg of potatoes, and taxes sausage consumption above 10kg per week at 50p per kg. Draw the household's budget set.
4. State and explain the axioms necessary to derive a consistent preference ordering. Is it reasonable to assume that all consumers do have preferences that conform to these axioms? What additional assumptions are required for well-behaved indifference curves? Are these assumptions reasonable? What assumptions are required to ensure that indifference curves do not cross?

Maths work

Please hand in the following problems:

- Worksheet 1: 1, 2, 3, 4, 5, 6, 9(a), 9(b), 10(a),10(b), 12(a)
 Worksheet 2: 1, 3, 4, 8, 9.

Conceptual checklist

You should prepare notes on the following (not to be handed in): Supply, demand, and equilibrium; budget constraints; budget sets; consumption bundles; opportunity cost; preferences and axioms; indifference curves; goods and bars; complements and substitutes; well-behaved preferences; MRS; normative and positive economics.

Week 2

Discussion questions

Short Essay (up to 1000 words plus diagrams):

Pensioners have well-behaved preferences and a fixed income to spend on food and winter fuel. In response to public concern about the implications for the elderly of high fuel prices, the government is considering two possible policies: (a) an increase in the old-age pension, or (b) a per-unit winter fuel subsidy for pensioners. Using indifference curve analysis, explain and compare the effects of these policies. Which is more effective?

Problem set

1. A student has £2 to spend on beer and orange juice. Initially, orange juice costs £0.50 a pint and beer costs £1 a pint.
 - a) Draw the student's budget line. Place orange juice on the horizontal (x) axis and beer on the vertical (y) axis.
 - b) Suppose that, following a College subsidy, orange juice costs £0.25 a pint for the first 10 pints, and £0.50 a pint thereafter. Draw the student's budget line in this case.
 - c) Repeat the exercise, but assume that the student has £4 to spend on drinks.

2. Thomas, a young Canucks fan, has four Henrik Sedin hockey cards, and two Alex Burrows hockey cards. Currently the prices of these hockey cards are CAD\$1.50 for Sedin, and CAD\$1.20 for Burrows. Thomas, however, would be willing to exchange one Sedin card for one Burrows card.
 - a) What is Thomas's marginal rate of substitution between Sedin hockey cards and Burrows hockey cards?
 - b) Can Thomas buy and sell hockey cards to make himself better off? If so, how?
 - c) Suppose Thomas has traded hockey cards and now no longer wants to make any other trades. What is his marginal rate of substitution between between Sedin hockey cards and Burrows hockey cards?

3. Sabine can't tell the difference between Columbian and Kenyan coffee – the two taste exactly the same to her.

- a) What is Sabine's marginal rate of substitution between Columbian and Kenyan coffee?
 - b) Draw a few of Sabine's indifference curves for Columbian and Kenyan coffee. Place Columbian coffee on the horizontal (x) axis and Kenyan coffee on the vertical (y) axis.
 - c) Sabine has £6 to spend on coffee this week. Kenyan coffee costs £1.50 per cup and Columbian coffee costs £1 per cup. Draw Sabine's budget line for Columbian and Kenyan coffee in the same diagram.
 - d) What is Sabine's optimal consumption bundle? Show this on your diagram.
 - e) If the price of Columbian and Kenyan coffee is the same, what combination of Columbian and Kenyan coffee will Sabine buy?
4. Max is a utility maximiser. His income is £100, which he can spend on canteen meals, and on notebooks. Each meal costs £5, and each notebook costs £2. At these prices, Max chooses to buy 16 canteen meals, and 10 notebooks. Now the price of notebooks falls to £1, while the price of canteen meals remains the same. At the same time, his income falls to £90. Do these two changes combined allow him to get onto a higher indifference curve, the same indifference curve as before, or a lower indifference curve?
 5. Define the following terms, choosing a logical order and providing a framework to show the relationships and differences between them: normal good, luxury, Giffen good, substitutes, inferior good, necessity, ordinary good, complements.

Maths work

Please hand in the following problems:

Worksheet 1: 7, 8, 9(c), 9(d), 10(c), 11, 12(b), 12(c), 13, 14

Worksheet 2: 5, 6, 7,

Conceptual checklist

You should prepare notes on the following (not to be handed in): Utility functions; ordinal and cardinal utility; marginal utility and the MRS; optimal

choice; MRS condition; demand functions; normal and inferior goods; ordinary and giffen goods.

Week 3

Discussion questions

To be handed in at the tutorial. Write a short essay (absolutely no more than 500 words) on: “Critically discuss the concept and use of the utility function”.

Problem set

1. An individual has a fixed income and buys two goods, apples and bananas.
 - a) Explain the difference between a normal good and an inferior good.
 - b) Explain, using a diagram, how the effect of a rise in the price of apples can be decomposed into a substitution effect and an income effect.
 - c) Under what conditions would a rise in the price of apples lead to an increase in this individual’s demand for apples?

Suppose now that the individual has an endowment of 3 apples and 1 banana, and has no income other than that from selling her endowment. The price of bananas is always 1. Assume that she has well-behaved preferences. Initially the price of apples is 1 and she consumes 2 apples and 2 bananas.

- d) Would a rise in the price of apples to 2 make the individual better off or worse off?
- e) Would a fall in the price of apples to 1/2 make her worse off (compared to the situation where the price of apples was 1)?

Write down and briefly explain the Slutsky equation capturing your answer to 1(b). Why is the substitution effect always opposite to the price movement?

2. Suppose that a consumer has a demand function for beer in the form $x_1 = 5 + \frac{m}{5p_1}$. Her income is £40 per week and the price of beer is £2 per pint. What is her demand for beer? Now suppose the price of beer falls to £1. What is her total demand at the new price? What is the substitution effect? What is the income effect?
3. a) Explain how a worker will vary the number of hours he works in response to a rise in the wage rate, decomposing the change into income and substitution effects.

- b) Write down the Slutsky equation for this problem.
- c) If a rise in the wage leads to a fall in hours worked, what does that imply about the income and substitution effects?
4. Pensioners have a fixed income in the form of a pension from the government, and well-behaved preferences over food and fuel. Suppose that the prices of food and fuel have recently changed: the Laspeyres price index has risen by 20%. If the government now increases the pension by 20%, what will happen to the welfare of pensioners?
5. Draw a diagram to illustrate the following decisions by a consumer with a fixed income facing a choice of two goods, X and Y:

	Income	Price of X	Price of Y	Amount of X purchased
Situation 1	40	1	1	20
Situation 2	60	2	1	25

Is this optimising behaviour with well-behaved preferences?

6. John is a utility maximizer. His weekly income is M , which he spends on goods x_1 and x_2 , costing p_1 and p_2 respectively.
- a) Draw John's budget constraint and show that the slope of the line is the ratio of the prices.
- b) John has the following utility function $U(x_1, x_2) = x_1 + x_2$. Derive and sketch John's demand curves for goods 1 and 2.
- c) Assume now that John's utility function is $U(x_1, x_2) = \min(x_1, x_2)$. Draw a few of John's indifference curves. Compare and contrast to part b.
- d) Illustrate graphically how a demand function for (i) normal good x_1 (ii) inferior good x_1 can be derived as the set of optimal quantities of x_1 , by varying p_1 (holding M and p_2 constant) in the preference maximization (x_1, x_2) space.
7. For a consumer with Cobb-Douglas utility $U = x_1^a x_2^{1-a}$, the demand functions are:

$$x_1 = \frac{am}{p_1}, \quad x_2 = \frac{(1-a)m}{p_2} \quad (1)$$

What special properties do these demand functions have? Draw a diagram to show the income and substitution effects of an increase in p_1 , illustrating the Cobb-Douglas properties.

Maths work

Please hand in the following problems:

Worksheet 3: Quick questions: 1-7

Conceptual checklist

You should prepare notes on the following (not to be handed in): Substitution and income effects (Slutsky and Hicks); Slutsky equation; the endowment; labour supply.

Week 4

Discussion questions

In no more than 500 words (excluding diagrams) address the following:

On the advice of an economic advisor, the Chancellor of the Exchequer decides to reduce the income tax bracket at which the 40% rate binds from £34,800 p.a. to £30,000 p.a. Analyse the likely effect of this policy on work incentives.

Not to hand in:

1. Textbooks often refer to the “Polonius point” in reference to a model of inter-temporal consumption. Why might that be?
2. Why might increased access to credit in developing countries help reduce child labour?

Problem set

1. An individual consumes x_1 of good 1 and x_2 of good 2. Utility is given by $u(x_1, x_2) = x_1^{1/2} x_2^{1/2}$. The consumer has an income of £40, the price of good 1 is 4 and the price of good 2 is 2.
 - a) Calculate the MRS for this utility function.
 - b) Draw a few of the indifference curves for this utility function.
 - c) What quantities maximise the consumer’s utility?
 - d) What is the marginal utility of income?
2. A student’s utility is given by $u(i, s, l) = i^{2/3} l^{1/3} s^{1/2}$, where i , l and s are the number of hours spent idling, lazing about, and sleeping respectively. A day contains 24 hours.
 - a) In a given day, how should the student allocate their time to maximise utility?
 - b) Once a week the student is required to spend an hour at a tutorial (from which utility is zero). How much less time should be spent sleeping that day?
3. Suppose the price of a good increases and the government decides to compensate each consumer for the price increase by giving each individual a lump-sum transfer equal to the increase multiplied by the original quantity purchased by that individual.

- a) When will this compensation strictly increase the welfare of consumers?
 - b) When will the compensation keep the consumer's welfare at the original level?
4. The demand curve for a good is given by: $Q_D = 28 - P$ and the supply curve is: $Q_S = P/2$
- a) Find the equilibrium price and quantity in this market.
 - b) What is the total consumers' surplus?
 - c) Suppose the government imposes a quantity tax on producers of 5 per unit. Find the equilibrium supply and demand prices, and the changes in consumer and producer surplus. Who is affected more by the tax? Why?
 - d) Explain why the equilibrium with the tax is inefficient. Calculate the deadweight loss.
 - e) Suppose the government imposes a price ceiling of 4. What will be the effect? How does this outcome differ from the equilibrium with the tax?
5. A consumer has well-behaved preferences for current and future consumption, c_1 and c_2 . He has current income y_1 , and future income y_2 , and can borrow or save at the market rate of interest. Write down his lifetime budget constraint. Suppose that at the initial interest rate he is a saver. Show that if the market interest rate rises he must be better off. Will his current consumption increase?

Maths work

Please hand in the following problems:

Worksheet 3: Long questions: 1

Worksheet 4: Quick questions: complete all, Long questions: 1

Conceptual checklist

You should prepare notes on the following (not to be handed in): Consumer and producer surplus; Compensating and Equivalent Variation; Cost of Living Indices; Elasticity ; Market Equilibrium; the Deadweight loss of a tax; present

value; Pareto efficiency.

Additionally, you should make notes on the applications of differential calculus to: Choice (Varian Ch 5 Appendix); Demand (Varian Ch 6 Appendix); Elasticities (Varian Ch 15 Appendix); The Slutsky Equation (Varian Ch 8 Appendix).

Week 5

Discussion questions

1. Are the following statements true or false? (Give a brief explanation.)
 - a) Average total costs always exceed average variable costs.
 - b) When marginal cost is increasing average cost must be increasing.
 - c) A perfectly competitive firm will not operate where marginal cost is less than average cost.
 - d) A perfectly competitive firm operating at a point of decreasing returns to scale must be making a profit.

2. What particular aspects of a perfectly competitive industry ensure that the condition “price=marginal cost” holds? Will the price of a product in a perfectly competitive industry be equal to:
 - a) The marginal cost of all firms in the industry;
 - b) The average cost of the marginal firm;
 - c) Both;
 - d) Neither?

3.
 - a) How are total, average and marginal cost curves derived from the production function of the firm and the costs of factors?
 - b) What is the link between the average cost function and returns to scale?
 - c) What is the economic rationale for the conventional assumption that the average cost function is U-shaped?
 - d) Why are average costs higher in the short-run?

Problem set

1. A firm has production function $Y = 6KL^{1/2}$ (where K and L are capital and labour).
 - a) Does it have decreasing, constant, or increasing returns to scale?
 - b) Draw the isoquants, with L on the vertical axis. What happens to the MRTS as K increases? Interpret this result.

- c) In the short run, capital is fixed at $K = 4$. Sketch the short-run production function, and find the marginal product of labour (MPL). Does the firm have constant, increasing or diminishing returns to labour?
- d) The market wage is w , and the market price of a unit of output is p . Explain why the firm will choose its labour input so that $p\text{MPL} = w$. If $p = 1$ and $w = 2$, how many workers will it employ?
2. A company producing bicycles has two plants, A and B. The numbers of bikes produced per month in the two plants are $Y_A = 40L_A^{1/2}$ and $Y_B = 210L_B^{1/3}$, where L_A and L_B are the numbers of workers employed. Suppose that 400 workers are currently employed in plant A, and 1000 in plant B. Find
- total output
 - output per worker
 - the marginal product of labour in each plant.
 - Should the company consider moving workers from one plant to another? Explain.
3. Suppose that cars are produced using workers and robots, according to a convex technology $Y = f(L, R)$. A firm wants to produce y_0 cars. Explain, using a diagram, how the firm should choose its inputs if the factor prices are w and r . What would happen if: (i) the wage increased? (ii) the design of robots improved?

Maths work

Please hand in the following problems:

Worksheet 5: Quick questions: complete all, Long questions: 1

Worksheet 6: Quick questions: 1-6, Longer questions: 2

Conceptual checklist

You should prepare notes on the following (not to be handed in): Production function, isoquants, marginal product, MRTS, returns to scale; profit maximisation and short-run labour demand; cost minimisation and conditional factor demands; cost function, marginal and average costs in the short-run and long-run.

Week 6

Discussion questions

Essay:

Consider a perfectly competitive industry. What are the short-run and long-run effects on price and industry supply of (i) a change in preferences which leads to an inward shift of the industry demand curve; (ii) technological progress which reduces each firm's marginal costs; and (iii) the introduction of a fixed annual charge which firms must pay in order to trade?

In less than 500 words each, address the following:

1. Since monopolies make super-normal profits, would it be a good idea to tax them?
2. (From KR) Airports limit the number of restaurants that can operate within their facilities. In some instances, all of the food concessions within an airport are granted to a single vendor, who pays rent to the airport. How much should a vendor be willing to pay to the airport to be the sole supplier? What would happen to the rent that the airport could charge if it decided to let a large number of suppliers set up restaurants on its premises?

Problem set

1. (From KR) According to Pommerehne and Kirchgasser (1987), the price elasticity of demand for theatre tickets in Germany is 1.73. Suppose that the price of theatre tickets falls by 10%. What happens to the quantity demanded? What happens to total expenditure on theatre tickets (or equivalently, theatre revenue)?
2. Draw a diagram to show how the monopoly price and quantity are determined.
 - a) Explain intuitively why the marginal revenue curve lies below the demand curve. Prove this algebraically.
 - b) What is the relationship between the monopoly price and the price elasticity of demand? Will production be at minimum average cost? Why or why not?
 - c) What is meant by the "deadweight loss of monopoly"?

3. Consider a perfectly competitive industry with 24 producers, each with cost function: $C(q) = 16 + 4q^2$. Market demand is given by $Q = 150 - 2p$.
 - a) Calculate the supply function for each individual firm $q(p)$, aggregate supply Q^S and the equilibrium price p^* .
 - b) In the long run, more producers (with the same cost function) can enter the market. How many producers will be in the market in the long-run equilibrium and what is their equilibrium production?
4. For a monopolist:
 - a) Why does the marginal revenue curve lie below the demand curve?
 - b) What is the relationship between the price elasticity of demand and the divergence between price and marginal revenue?
 - c) Will the monopolist produce at minimum average cost?
 - d) If the demand curve is $q = 100 - 0.5p$ and the monopolist's total cost function is $C(q) = q^2$, what output would a profit maximising monopolist choose? What is the price elasticity of demand at this output?

Maths work

Please hand in the following problems:

Worksheet 6: Quick questions: 7, 8, Long questions: 2

Conceptual checklist

You should prepare notes on the following (not to be handed in): Elasticity, and relationship to Revenue and Marginal Revenue; Monopoly Pricing; Natural Monopoly; Monopoly Profit Maximisation and Supply; Monopoly Inefficiency and Deadweight Losses; First, Second and Third Degree Price Discrimination; Monopoly and Factor Demands; Monopsony.

Week 7

Problem set

Questions marked with an asterisk are optional:

1. What does each of the following terms imply about the partial elasticities of the demand function $x_1(p_1, p_2, m)$? Normal good, inferior good, luxury, necessity, ordinary good, Giffen good, complements.
2. A student receives a scholarship of £2000 per annum. £1000 of this is needed for essential expenditure. The rest can be spent on books, price £20 each (with no second-hand value) and luxuries, price £10 (which contribute only to current utility). The student's utility function is:

$$U(B, L) = B^2 L^3$$

- a) Find the marginal utilities of books and luxuries, and the MRS of luxuries for books, as a function of B and L. Is this a well-behaved utility function?
 - b) The student chooses his consumption of books and luxuries to maximise his utility. Will he spend all his income? Why?
 - c) Using the condition $MRS = -p_1/p_2$, find how many books and luxuries he will buy.
 - d) Now consider the more general problem when disposable income is I and the prices of books and luxuries are p_B and p_L . Repeat the analysis in (c) to find the demand function for books, as a function of prices and income. What special properties does this demand function have?
 - e) Are these "luxuries" in the economic sense?
 - f) How does the analysis change if books have a second-hand value of £5?
3. * Using the same method as in question 4(d) find the demand functions for books and luxuries when the utility function is:

$$U(B, L) = 2B^{1/2} + L$$

What special property arises here? Illustrate it using an indifference curve diagram. Are luxuries luxuries in this case?

4. * See Varian Ch 8A

- a) Write down and explain the Slutsky Equation in terms of partial derivatives.
- b) The demand function corresponding to a Cobb-Douglas utility function is:

$$x_1(p_1, m) = \frac{am}{p_1}$$

where $0 < a < 1$ is a constant. Find the substitution and income effects of a price change, and show that both are negative in this case.

Maths work

Please hand in the following problems:

Worksheet 7: Complete all except last question.

Worksheet 8: 1-4.

Week 8

Discussion questions

Essay: Explain and compare what happens in a duopoly when the firms compete in quantities (a) simultaneously, and (b) sequentially. How do your conclusions change when firms compete in prices rather than quantities? Which model – quantity-setting or price-setting – is better?

Problem set

1. What is a (strategic-form) game? Give an example of a situation (from politics, economics or management) that could be modelled as a game?
2. A man with a hand grenade comes up to you in the street and says, “Give me one pound, or I will pull the pin.” Assume that, if he pulls the pin, you both receive a large negative payoff. Draw a game tree to illustrate this situation. How might an economist solve this sort of game? What would you do?
3. There are two firms (A and B) in an industry. Firm A has costs $C = F + cq_A$ and firm B has cost $C = F + cq_B$, where q_A and q_B are the amounts produced by the respective firms. Market demand is $Q = a - P$, and total supply is $Q = q_A + q_B$.
 - a) Write down the profits for each firm, and hence find their reaction (or best?response) curves. What would firm A produce if firm B set $q_B = 0$?
 - b) Identify the Nash (Cournot) equilibria of this game.
 - c) What is the market price at equilibrium? What are profits?
 - d) Suppose both firms chose to produce $q_A = q_B = (a - c)/4$. How much profit would they make? Why is this not a Nash equilibrium?
 - e) Calculate the output that would be sold under perfectly competitive conditions in this market. What would a monopolist produce? How does Cournot competition compare with perfect competition and monopoly?
 - f) Illustrate your answer to (a) to (e) using a diagram.
4. Two firms with identical marginal costs and no fixed costs simultaneously choose prices. The firm with the lower price serves the entire market. If prices are equal, the firms share the market equally. What is the Nash (Bertrand) equilibrium?

Maths work

Please hand in the following problems:

Worksheet 8: 5,7

Conceptual checklist

You should prepare notes on the following (not to be handed in): Price Discrimination; Monopsony; Monopolistic Competition; Cournot, Bertrand and Stackelberg models of oligopoly; Collusion.