

Study Guide

Final Exam, Microeconomics

1. If the price-consumption curve of a commodity slopes downward how can you tell whether the consumer spends more or less on this commodity from her budget (income)?

Re 1:

- a. Take a commodity space with 2 commodities (2-dimensional space). Put the quantity consumed of commodity X on the horizontal, and the quantity consumed of commodity Y on the vertical axis. Start with the consumer's current budget constraint: $p_x \cdot X + p_y \cdot Y = m \Rightarrow Y = \frac{m}{p_y} - \frac{p_x}{p_y} \cdot X$.
 - b. Now assume that the price of X, p_x is decreasing. That will rotate the budget constraint outwards, i.e., it becomes flatter and flatter as p_x is decreasing even further. Put some of these additional budget constraints in your graph.
 - c. It's time to draw the consumer's indifference curves that have just one common point with the previously drawn budget constraints, i.e., you will find the points of tangency this way.
 - d. If you connect these tangency points you obtain the price-consumption curve. When the PCC is downward sloping you can be sure that X's price decreases less than what its quantity consumed increases with, i.e., X's share from the consumer's total spending is increases.
2. Assume that you know the inverse market demand, which is a linear function: $P(Q) = A - BQ$. How would you find the own price elasticity of market demand at different prices?

Re 2: You just need to recall and apply the formula from your lecture notes or from your textbook:

$$\varepsilon = \frac{P}{Q} \cdot \frac{1}{\text{slope}}$$

3. As you move down on the inverse demand curve starting at the maximum price where quantity purchased becomes zero, how will own price elasticity change?

Re 3: Looking at the formula in Q #2 immediately tells you that at the maximum price where $Q = 0$, ε will be infinite. At the other end of the demand curve, where $P = 0$, $\varepsilon = 0$. From this you can derive the rule: as price is decreasing, own-price elasticity moves along with it. Remember: if $\varepsilon > 1$, we called that part of the demand curve elastic, if $\varepsilon < 1$, it was called the inelastic portion of the demand curve, and at $\varepsilon = 1$ we had unit elastic demand.

4. You must know how cross price elasticity changes as the price of the first (or the other) commodity is changing if you have substitute or complementary goods, respectively.

Re 4: You just need to think about what happens to quantity demanded of a commodity if the price of its substitute is increasing or decreasing. You can do it in a similar way if the price of a good is changing that is a complement to the original one.

5. You need to be familiar with the Engel curve and how it is changing if the consumer buys a common good, an inferior good or a Giffen good.

Re 5: You can find the Engel curve of a commodity if you assume that the consumer's nominal income is increasing—or it is decreasing—and represent it by an outward or an inward shift of the consumer's budget constraint. And you need to remember how we defined a normal good, an inferior, a common and a Giffen-good, respectively.

6. What is the difference between a consumer's nominal and real income?

Re 6: You need to be familiar with the definitions.

7. You must know how the total effect of a price change can be divided into substitution effect and income effect, and for which types of commodities (normal good, common good, inferior good, Giffen good) are they moving in the same or in the opposite direction.

Re 7:

- a. We assume that the price of commodity X is changing, let's say, decreasing. That rotates the consumer's budget constraint outwards, i.e., the budget constraint becomes flatter, and it will be tangent to an indifference curve that lies above the original one. You can, actually, read the change in the consumer's demand of X as a result of the price change from your chart. It's just the difference between the two quantities purchased after and before the price change.
 - b. Now you assume that the consumer's nominal income will be reduced to the level where she can purchase a commodity basket that lies on the same indifference curve where her original choice was. That is, the consumer's **real income** is kept unchanged after the change of p_x . Reducing the consumer's nominal income means that the budget constraint **shifts** to the left (downward) until it becomes tangent to the indifference curve that includes the consumer's original choice. That is, we take some nominal income away from the consumer so that she can be at the same level of satisfaction as before the change of p_x . The point of tangency will be different though from the original one. The distance between the consumer's choice of commodity X after the price decrease and her new choice of the same commodity after the income adjustment—this difference can be read on the horizontal axis—will be the magnitude of the substitution effect on commodity X . The difference between the consumer's new choice after the income adjustment following the price decrease and her original choice before the price decrease will be the income effect on the consumption of commodity X .
 - c. The line of reasoning would be basically the same with an increase in p_x , but we would give rather than take away some of the consumer's nominal income so that her real income wouldn't be reduced because of the price increase.
8. We discussed in class how to find (calculate) the arc elasticity of demand if you know only two points of the demand curve. You need to be capable of calculating arc elasticity given those two points.
9. If the demand curve is a horizontal straight line, its elasticity is infinite, if it is a vertical straight line, the price elasticity of demand will be zero. But when will the whole demand curve (which is not a straight line any more) be unit elastic?

Re 9: You calculate the own price elasticity by multiplying the $(1/\text{slope})$ by P/Q . Since the slope of the demand curve is not constant now, and (P/Q) is decreasing, how should the slope of the inverse demand curve change in order to receive unit elasticity from their product?

10. What is income elasticity? How would that change with regard to a normal or common good, or to an inferior or Giffen good, should the consumer's income increase or decrease?

11. You need to know how to derive the market demand curve (function) once you have the individual demand curves. Please, remember: you must pay attention to the relevant price range of each individual consumer when you sum up their quantity demanded.
12. If market demand is given by $P(Q) = A - BQ$, how would you calculate a company's total revenue at any relevant price level? At which price level will total revenue be maximized? How large is the own-price elasticity of demand at that price?

Re 12: Total revenue = Price x (Quantity demanded by consumers) at that price level. To find the maximum attainable revenue of the firm—if the demand curve (and the inverse demand curve) are linear, you need to use the following formula (the first order condition of maximum revenue):

$$MR(Q) = \frac{dTR(Q)}{dQ} = \frac{d[P(Q) \cdot Q]}{dQ} = \frac{dP(Q)}{dQ} \cdot Q + \frac{dQ}{dQ} \cdot P = P \left(1 - \frac{1}{|\varepsilon|} \right) = 0. \text{ Since } P \neq 0 \Rightarrow |\varepsilon| = 1.$$

13. We defined the consumer price index (CPI) as the change of the aggregate value of a standard commodity basket that is defined by the governments' statistical office, from one year to the other. Statistical offices tend to include those commodities in the basket whose price changes more than the price of other products or services. How would that affect the CPI, and ultimately, the rate of inflation?
14. When we discussed the companies' technology and supply we made a distinction between the short-run and the long-run production function of a company. How would you define these terms?
15. How did we define the marginal product function of the input factors (labor, capital, etc.)?
16. You need be familiar with the concept of future value (FV) and present value (PV) of a money flow.

Re 16:

- a. FV is the value of your savings, that is $m \cdot (1+r)^t$ if you deposit the amount of $\$m$ to your bank and leave it there for t years.
- b. PV is the current value of future money flows, i.e., how large a share of $\$m$ can you spend today if you receive $\$m$ a year, 2 years, ..., t years from now? If you want to spend the amount today, you need to borrow from a bank at an interest rate of r . You need to repay your loan with interest later. Consequently, you cannot spend the whole amount of $\$m$ now, just $\frac{m}{(1+r)^t}$ if you receive $\$m$ t years from now.

17. We introduced the notion of the Marginal Rate of Substitution (MRS) when we discussed the consumer's optimum choice. With two commodities in the consumer's basket, MRS is the ratio of the marginal utility from consuming commodity X and from consuming commodity Y. $[MRS(X, Y) = MU_X/MU_Y]$. You can apply the same concept to consumption in different time periods. If $MRS(X_1, X_0) < 1$, that is, $MU_1 < MU_0$ —where the indices 0 and 1 stand for period 0 and period 1, respectively, the consumer values future consumption below current consumption. This what we called “negative time preference”.
18. You need to remember how to calculate consumer surplus and producer surplus.
19. How can we derive the market supply curve from individual supply curves?

20. If a producer uses an input factor (e.g., capital) in a fixed quantity but the quantity of the other input factor, say labor, is increasing, then the output level of the producer will exponentially increase, but only up to a certain production level. Beyond that level, diminishing returns will set in.
21. You need to be familiar with the concept of increasing, constant and diminishing returns to scale.
22. You need to remember that we derived the companies cost function from finding the minimum cost level of a given output quantity. That means that we need to find the lowest iso-cost line (same-cost line) that is tangent to the given isoquant curve. It is a conditional cost minimization exercise, finding minimum costs with the condition that a specific quantity should be produced.
23. We discussed in class that total average cost is decreasing if the marginal cost curve is below the average cost curve, but ATC will increase if the MC curve is above the ATC curve. The same rule applies to the marginal product and the average product of a company. Why?

Re 23: You need to think about how an average can increase or decrease. If the additional amount (marginal cost or product) is larger than the existing average itself that will pull the average upwards. If the additional amount (marginal cost or product) is smaller than the existing average that will decrease the average.

24. You need to know how to find a company's cost function in the short-run and in the long-run, given the input factor prices and the production function of the firm.

Re 24: From the production function $Q = f(L, K)$ you can express L or K as a function of the other input factor and the quantity produced. Since quantity is fixed the only variable you need to work with is one of the input factors, L or K . Now you plug the expression of L or K from the production function back into the cost function—which has the form of $w \cdot L + r \cdot K(q, L)$, where w and r are the factor prices and $K(q, L)$ just shows that you expressed K as a function of L from the production function at any production level of q —and you need to find the minimum of this expression. Remember, we find the minimum by setting the first derivative of the function equal to zero.

25. You need to be familiar with the specific features of the average fixed cost curve [AFC(q)], the average variable cost curve [AVC(q)] and the total average cost curve [ATC(q)].
26. You need to be able to define the basic conditions of a perfectly competitive market (industry), those of a natural monopoly, monopolistic competition and oligopoly.
27. We assumed in this course that firms strive to maximize their profit. How do perfectly competitive companies find the profit maximizing level of their output?

Re 27: The only important condition of profit maximization for a perfectly competitive company is that this firm takes the market price as given and adjusts its production to the fixed market price. The firm applies the principle of $MB = MR = MC$.

28. How will a monopoly find its profit maximizing output level or the profit maximizing price?

Re 28: The monopoly also applies the $MR = MC$ principle, but its MR is changing as it tries to sell more or less of its product, because a change in sold quantity will affect the market price. For instance, with a linear inverse demand curve $P(Q) = A - BQ$, the monopoly's MR will be: $MR(Q) = A - 2BQ$ and the firm will set this expression equal to its marginal cost. Say, the MC of this monopoly is constant at c . Then from

$A - 2BQ = c$ it follows that the profit maximizing quantity $Q_M = \frac{A - c}{2B}$, and plugging this expression back into the inverse demand curve we immediately receive the profit maximizing price, too: $P_M = \frac{A + c}{2}$.

29. How did we define the shut-down condition for companies in the short run and in the long run?

30. What is the break-even condition for the profit maximizing companies?

31. How did we distinguish economic profit and accounting profit?

32. How much economic profits will perfectly competitive companies collect in the long-run? What flows from this regarding the long-run supply curve of the companies?

Re 32: Since entry to perfectly competitive markets is free, new companies will enter until they expect to collect positive economic (extra) profit. The entry of additional companies stops when economic profit becomes zero. The entry of additional firms also implies that the market supply curve becomes flatter and flatter, i.e., more and more elastic.