

1. Ana has monotonic and strictly convex preferences. Bundles (3, 6) and (4, 8) are on the same indifference curve. Then bundle (5, 10) is:
 - a) On a lower indifference curve.
 - b) On the same indifference curve too.
 - c) On a higher indifference curve.
 - d) The information is not enough to answer.
2. The utility function $u(x, y) = x^{0.5} + y^{0.5}$ describes:
 - a) Cobb-Douglas preferences.
 - b) Perfect substitutes preferences.
 - c) Quasi-linear preferences.
 - d) None of the other alternatives is correct.
3. Ana's preferences are described by $u(x, y) = x^2 + 0.5y^2$. The prices are the same. Then at the optimal bundle:
 - a) $x = 0.5y$.
 - b) $x = 2y$.
 - c) Ana consumes good x only.
 - d) Ana consumes good y only.
4. Ana's preferences are strictly convex, and her optimal bundle is (x^*, y^*) . Then the price of good x increases and her income increases too, so that her new budget line includes her old optimal bundle. Then her new optimal bundle:
 - a) Will include more good x and less good y.
 - b) Will not change.
 - c) Will include less good x and more good y.
 - d) The information is insufficient to answer.
5. The income expansion path is given by $x = 0.5y$. Then:
 - a) Good x is a normal good; good y is an inferior good.
 - b) Good y is a normal good; good x is an inferior good.
 - c) Both goods are normal goods.
 - d) The information is insufficient to answer.
6. Which of the following guarantees that the demand curve is negatively sloped?
 - a) Marginal rate of substitution is decreasing.
 - b) The good is a normal good.
 - c) The demand curve is always negatively sloped.
 - d) Preferences are monotonic and strictly convex.
7. When a price rises the (Slutsky) income effect is:
 - a) The extra income the consumer would need to be able to buy the old optimal bundle.
 - b) The extra income the consumer would need to be able to buy a bundle on the same indifference curve as old optimal bundle.
 - c) The income the consumer would be willing to forgo to avoid the price increase.
 - d) None of the other alternatives is correct.
8. Ana can lend or borrow at an interest rate of 3%. Then the slope of her budget line (with period 1 on the horizontal axis as usual) is:
 - a) $-1/0.97$.
 - b) -1.03 .
 - c) -0.97 .
 - d) $-1/1.03$.
9. Ana is a net buyer of good x. Then the price of good x falls. Then
 - a) Ana will increase consumption of good x, and will be better off.
 - b) Ana will remain a net buyer of good x and will be better off, but we cannot tell whether she will increase consumption of good x.
 - c) Ana may want to become a net seller of good x, in which case we cannot tell whether she will be better off or worse off.
 - d) Ana may want to become a net seller of good x, in which case she will be worse off (but better off than if she remained a net buyer).

Midterm Test — Group II

1. You cannot look up books or notes of any kind. Invigilators will not help you with the test.
2. Switch off and put away any graphical calculators, computers, mobile phones, or any other data storage device.

All questions are independent of each other.

- a) [1.9 marks] Take the utility function $u(x, y) = x^{0.5} + y^{0.5}$. Does this function describe strictly convex preferences? Explain.
- b) [3.5 marks] Ana's preferences are described by $u(x, y) = 10x^{0.5} + y$. Find the demand functions for goods x and y . Explain your reasoning.
- c) [3.5 marks] Ana's demand functions are $x(p_x, p_y, m) = 0.6m/p_x$ and $y(p_x, p_y, m) = 0.4m/p_y$. Her income is $m = 50$, and the prices are $p_x = 3$ and $p_y = 4$. Then the price of good x rises to $p_x' = 5$. Find the change in the quantity demanded of good x , and the substitution and income effects. Explain your reasoning and illustrate in a graph.
- d) [3 marks] Ana buys goods x and y . She is buying 20 units of x . Then the price good x increases by €3 per unit. Explain what the compensating variation is in this context and illustrate it in a graph. Can the compensating variation be less than €60 (the extra income she would need to keep buying her old bundle)? Can it be more than €60? Can it be exactly €60? If so what determines whether it is more than, less than, or exactly €60? (The graph may help.)

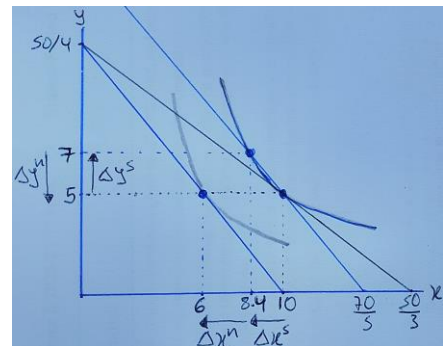
Answers to Group I

1	2	3	4	5	6	7	8	9
a	d	c	c	c	b	d	b	b

Answers to Group II

- a) It does. $MRS = -MU_x/MU_y = -(y/x)^{0.5}$; it falls (in absolute value) as we move down along the indifference curve (hence getting more good X and less good Y); therefore, preferences are strictly convex.
- b) From the budget line equation and the condition $MRS = -p_x/p_y$ we get $x(p_x, p_y, m) = 25(p_y/p_x)^2$ and $y(p_x, p_y, m) = m/p_y - 25p_x/p_y$.

- c) She first buys $x(3, 4, 50) = 0.6 \cdot 50/3 = 10$ (and $y(3, 4, 50) = 5$); to keep her real income constant, which we understand as she having just enough nominal income to buy her old bundle at the new price, she would need an income of $m' = m + \Delta p_x x = 50 + 2 \times 10 = 70$; with the new price and this increased income she would buy $x(5, 4, 70) = 8.4$; so the substitution effect is $\Delta x^s = 8.4 - 10 = -1.6$. But with her actual income (so lower real income) she only buys $x(5, 4, 50) = 6$; so the income effect is $\Delta x^n = 10 - 8.4 = -2.4$.



- d) See Varian, chapter "Consumer Surplus," section "Compensating and Equivalent Variations" for the definition and graphical illustration. In this case the compensating variation will be no more than €60. With an extra €60 she would be able to keep buying her old bundle, and this would be enough to reach her old indifference curve. But with strictly convex preferences that is more than enough, because with the new prices there will be cheaper bundles on the same indifference curve. Check Varian's illustration (section indicated above). In his example the compensating variation is less than the extra income the consumer would need to buy her old bundle, but is enough to buy a bundle just as good, i.e. on the same indifference curve. If Ana's preferences are not strictly convex maybe her old bundle is still the cheapest on her old indifference curve even at the new prices (that will be the case, for instance, if the goods are perfect complements to her), in which case the compensating variation would be exactly €60.