

	Microeconomics Fall 2026-2027 Mock Midterm October 2026 Duration: 1 hour (60 minutes) Total: 20 points (Part A: 10 points, Part B: 10 points) Coordinator: Matilde Cappelletti
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General Guidelines

- You may use a calculator;
- You may not use a programmable calculator;
- You may not use notes or books;
- All other belongings, including phones, must be on the floor;
- Write your name and student number on every answer sheet;
- Any form of fraud will, at least, imply an invalid grade for this course.

Full Name: _____

Student ID: _____

True / False questions

For each statement, state whether it is true or false and justify your answer briefly. Each statement is worth 1 point (10 points in total): 1 point for the correct answer with a correct justification, 0.5 points for the correct answer with an incomplete justification, and 0 otherwise. An answer without justification will not receive any marks.

1. A utility function is cardinal, so the actual numeric values it assigns carry meaningful economic interpretation (e.g., $u(x) = 10$ is “twice as good” as $u(x) = 5$).

☐ True ☐ False

Justification:

2. The marginal rate of substitution can be written as $MRS = -MU_1/MU_2$.

☐ True ☐ False

Justification:

3. A preference relation that is both complete and transitive is called rational.

☐ True ☐ False

Justification:

4. Under completeness, transitivity and convexity there exists a continuous utility function that represents those preferences.

☐ True ☐ False

Justification:

5. At the optimal bundle, the marginal rate of substitution must be greater than the economic rate of substitution.

☐ True ☐ False

Justification:

6. Transitivity requires that if $x \succsim y$ and $y \succsim z$, then $z \succsim x$.

☐ True ☐ False

Justification:

7. The Marshallian demand function $x(p, m)$ gives the bundle that minimizes the expenditure needed to reach a target utility level.

☐ True ☐ False

Justification:

8. With good 1 on the horizontal axis and good 2 on the vertical axis, the slope of the isobudget line is p_2/p_1 .

☐ True ☐ False

Justification:

9. The MRS captures how much of good 2 a consumer is willing to give up to get one more unit of good 1, while moving along the budget line, holding total spending constant.

☐ True ☐ False

Justification:

10. With two goods, the Lagrangian for the utility-maximization problem has two unknown endogenous variables and therefore two first-order conditions.

☐ True ☐ False

Justification:

Calculation questions

Questions 11–20 are worth 1 point each (10 points in total); where a question has several parts, the credit per part is shown in brackets. Show your calculations; if a question does not ask for an explanation, there is no need to give one.

11. Find the partial derivatives f_x and f_y of $f(x, y) = x^2y(6 - x - y)$.

12. Let $g(x, y) = xy(12 - 3x - 2y)$.

- (a) **[0.5]** Find all critical points with $x > 0$ and $y > 0$ by solving the system of first-order conditions.
- (b) **[0.5]** Check the second-order conditions and classify the critical point.

13. Find the marginal rate of substitution of $u(x_1, x_2) = x_1^{0.3}x_2^{0.7}$ and evaluate it at the bundle $(x_1, x_2) = (6, 14)$.

14. A consumer has utility $u(x_1, x_2) = x_1^{1/3} x_2^{2/3}$, income $m = 60$ and faces prices $p_1 = 2$ and $p_2 = 4$. Find the optimal bundle.

15. A consumer has the quasilinear utility function $u(x_1, x_2) = 2\sqrt{x_1} + x_2$, income m and faces prices p_1 and p_2 . Set up the Lagrangian and find the Marshallian demand function for good 1 (assume an interior solution).

16. The indirect utility function is $v(p, m) = \frac{m}{2\sqrt{p_1 p_2}}$. Find the Lagrange multiplier λ at $p_1 = 1$, $p_2 = 4$. Which exogenous variable do you differentiate with respect to?

17. The expenditure function is $e(p, u) = 2\sqrt{p_1 p_2} u$. Use Shephard's lemma to find the Hicksian demand $h_1(p, u)$ and evaluate it at $p_1 = 1$, $p_2 = 4$, $u = 10$.

18. A consumer has the indirect utility function $v(p_1, p_2, m) = \frac{m - 2p_1}{2\sqrt{p_1 p_2}}$, defined for $m > 2p_1$. Use Roy's identity to derive the Marshallian demand $x_1(p_1, p_2, m)$. Show the derivatives you take.

19. A consumer has the Marshallian demand function $x_1(p_1, p_2, m) = 1 + \frac{m}{2p_1}$. At $p_1 = 1$, $p_2 = 4$ and $m = 20$, use the Slutsky equation, $\partial x_1 / \partial p_1 = SE - IE$ with $IE = x_1 \partial x_1 / \partial m$, to find the substitution effect and the income effect. Is good 1 normal or inferior? Ordinary or Giffen?

20. A consumer has utility $u = \sqrt{x_1 x_2}$ and income $m = 40$. The price $p_2 = 4$ is fixed and p_1 rises from 1 to 4. Her initial utility is 10. Find the compensating variation.