

Name:	Roll Number:

Quiz 04 (Set C)  
SIAS, Krea University (AY 2025-26)  
Mathematical Methods for Economics (Course Code: ECON211)  
12 September 2025

Maximum Points: 10Duration: 30 minutes

- Instructions and Advice:
- This is a closed book quiz.
  - This quiz accounts for 10% of your grades.
  - You need to answer 8 questions in all.
  - All questions are compulsory. Points for each question are mentioned in parentheses.
  - Please select only one choice for the multiple choice questions.
  - At no point during the exam, you are allowed to ask clarificatory questions. Make reasonable assumptions if you have doubts and proceed to answer the question.
  - You are not permitted to use any electronic device including calculators.
  - There is plenty of time. Use it wisely, do not rush.
  - All the best!

## Multiple Choice Questions

1. (1 point) Let  $f(x) = \ln(3 + e^x)$ . Then,  $f''(0)$  is

- A.  $\frac{2}{9}$
- B.  $\frac{1}{4}$
- C.  $\frac{1}{2}$
- D.  $\frac{3}{16}$

Answer: \_\_\_\_\_

2. (1 point) Consider the following statements:

**Statement (i):**

$f(x) = e^{x-2}$  is a strictly increasing function.

**Statement (ii):**

$g(x) = 2 - 4x^2$  is a strictly convex function.

- A. Both (i) and (ii) are correct.
- B. Statement (i) is correct but statement (ii) is wrong.
- C. Statement (i) is wrong but statement (ii) is correct.
- D. Both (i) and (ii) are wrong.

Answer: \_\_\_\_\_

3. (1 point) Let  $f(x) = \sqrt{2x + \sqrt{x}}$ . Then  $f'(x)$  is

- A.  $\frac{2\sqrt{x} + 1}{2\sqrt{x}(\sqrt{2x + \sqrt{x}})}$
- B.  $\frac{2\sqrt{x} + 1}{4\sqrt{x}(\sqrt{2x + \sqrt{x}})}$
- C.  $\frac{4\sqrt{x} + 1}{4\sqrt{x}(\sqrt{2x + \sqrt{x}})}$
- D.  $\frac{2\sqrt{x} + 1}{(\sqrt{2x + \sqrt{x}})}$

Answer: \_\_\_\_\_

### Short Answer Questions-I

4. (1 point) Without using calculus, compute the minimum (or the maximum) value of the following function:  $f(x) = 7 - (x - 4)^2$ . (*Hint: Graph the function.*)

5. (1 point) Let  $3xy^2 + x^2y = 5$ . Find  $\frac{dy}{dx}$ . Simplify the answer as much as possible.

6. (1 point) Let  $f(x) = \ln(2 + e^{x-1})$  and let  $g(x) = f^{-1}(x)$ . Find  $g'(x)$ .

### Short Answer Questions-II

7. (2 points) Find and classify all the stationary/inflection points for the following function:  $f(x) = x^3 - 3x + 10$ .

8. (2 points) You work for an online retailer and you have been tasked with estimating the elasticity of demand for their product. The demand function is  $q = \frac{2}{3}\sqrt{144 - p^2}$ .

(a) (1 point) Compute the elasticity of demand when  $p = 8\sqrt{2}$ .

(b) (1 point) Based on your previous answer, what should be the firm's pricing strategy (increase or decrease the price?) that will boost revenue? Explain briefly.

