Name:	Roll Number:

Quiz 04 (Set A)

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

Maximum Points: 10 **Duration**: 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) Consider the following statements:

   Statement (i):

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

   Statement (ii):

   $g(x) = x^2 - 2$ is a strictly concave 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: _____

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

   A. $\dfrac{2\sqrt{x} - 1}{4x(\sqrt{x} + x)}$

   B. $\dfrac{4\sqrt{x} - 1}{4x(\sqrt{x} + x)}$

   C. $\dfrac{2\sqrt{x} + 1}{4\sqrt{x}(\sqrt{x + \sqrt{x}})}$

   D. $\dfrac{2\sqrt{x} + 1}{(\sqrt{x + \sqrt{x}})}$

   Answer: _____

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

   A. $\dfrac{1}{4}$

   B. 1

   C. $\dfrac{1}{2}$

   D. 2

   Answer: _____

Short Answer Questions-I

4. (1 point) Let $xy^2 + 2x^2y = 3$. Find $\dfrac{dy}{dx}$. Simplify the answer as much as possible.

5. (1 point) Let $f(x) = \ln(2 + e^{x-3})$ and let $g(x) = f^{-1}(x)$. Find $g'(x)$.

6. (1 point) Without using calculus, compute the minimum (or the maximum) value of the following function: $f(x) = (x-2)^2 + 5$. (*Hint: Graph the function.*)

Short Answer Questions-II

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

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 $p = 6$.

   (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.

Rough Work