SHANGHAI JIAO TONG UNIVERSITY, UM-SJTU JOINT INSTITUTE

Introduction to Numerical Analysis
HW8

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1 QUESTION 1

(a) It's convex as $f''(x) = e^x > 0$.

(b) It's concave as

$$\begin{aligned} RHS - LHS &= tf(x) + (1-t)f(y) - f(tx + (1-t)y) \\ &= [tx_1x_2 + (1-t)y_1y_2] - [tx_1 + (1-t)y_1][tx_2 + (1-t)y_2] \\ &= -t(1-t)(x_1y_2 + x_2y_1) < 0 \end{aligned} \tag{1.1}$$

2 QUESTION 2

1.

3 QUESTION 3

1.

4 QUESTION 6

1.