

Exercise 05 (No need to hand in)

1. Questions from textbook

Page #	Exercise #	Question #
250	9.5	3a (function in Question 2a)
254	9.6	2
312	11.3	1b, 1c, 2, 4d, 4e

2. Find $f'(x)$, $f''(x)$ and stationary points of the following functions:

(a) $f(x) = x_1^2 + x_1x_2 + x_2x_3 + x_3^2 + 2x_1 - x_2$

(b) $f(x) = e^{x_1} (x_1^2 + 2x_1x_2 - x_2^2 - 6)$

3. Check the following matrix for definiteness

$$\begin{pmatrix} -2 & -1 & 0 \\ -1 & -6 & 4 \\ 0 & 4 & -3 \end{pmatrix}$$

4. Determine the value(s) of a for which the following matrix is positive definite, positive semidefinite, negative definite, negative semidefinite, or indefinite (there may be no values of a satisfying the conditions)

$$\begin{pmatrix} a & 1 & -1 \\ 1 & -1 & 0 \\ -1 & 0 & 2 \end{pmatrix}$$