Norwegian University of Science
and Technology
Department of Mathematical
Sciences

MA1201 Linear Algebra and Geometry Autumn 2019

Exercise set 05

Due by 29 September 2019

Part 1: Start-up-exercises/Del 1: Kom-i-gang-oppgaver

In this exercise set the start-up-exercises are multiple choice. Give a reason for your choice.

Exercise 01

$$\det \begin{bmatrix} 1 & 3 & 4 \\ 0 & 1 & 2 \\ 0 & 1 & 4 \end{bmatrix} = 4 - 2 = 2.$$

Find

$$\det \begin{bmatrix} 1 & 0 & 0 \\ 3 & 1 & 1 \\ 4 & 2 & 4 \end{bmatrix}.$$

(a) $\frac{1}{2}$ (b) 2 (c) 4

Exercise 02

$$\det \begin{bmatrix} 1 & 3 & 4 \\ 0 & 1 & 2 \\ 0 & 1 & 4 \end{bmatrix} = 2.$$

Find

$$\det \begin{bmatrix} 1 & 5 & 10 \\ 0 & 1 & 2 \\ 0 & 1 & 4 \end{bmatrix}.$$

(a) $\frac{1}{2}$ (b) 2 (c) 4

Exercise 03

$$\det \begin{bmatrix} 1 & 3 & 4 \\ 0 & 1 & 2 \\ 0 & 1 & 4 \end{bmatrix} = 2.$$

Find

$$\det \begin{bmatrix} 5 & 6 & 4 \\ 2 & 2 & 2 \\ 4 & 2 & 4 \end{bmatrix}.$$

(a) $\frac{1}{2}$ (b) 2 (c) 4

Exercise 04 Find the unique solution to

$$\begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix} \mathbf{x} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

By using Cramer's rule.

(a) $(\frac{4}{5}, \frac{7}{5})$ (b) $(\frac{3}{5}, \frac{1}{5})$ (c) $(\frac{2}{5}, \frac{2}{5})$

Exercise 05 Compute $2(3, 4) + 7(1, 2)$

(a) $(13, 15)$ (b) $(13, 22)$ (c) $(56, 84)$

Exercise 06 Can $(1, 2, 3)$ be expressed as a linear combination of $(1, 0, 1)$ and $(0, 1, 2)$?

(a) Yes. (b) No.

Part 2: Compulsory exercises/Del 2: Obligatoriske oppgaver

Hand in these exercises.

Exercises from ELA

2.2 Evaluating Determinants by Row Reduction
Exercise 48; 50; 55.

2.3 Properties of determinants; Cramer's rule.
Exercise 73; 86; 89.

3.1 Vectors in 2-Space, 3-Space and n-Space
Exercise 18; 20; 28; 30.