Exam exercises

Problem 1.
Exam MET1180 (December 2021) Exercise 3
Consider the linear system $A \cdot \mathbf{x} = \mathbf{b}$ with parameter a, given by

$$A = \begin{pmatrix} 1 & 2 & 1 & 4 \\ 3 & 7 & 2 & a \\ 5 & 12 & 3 & -3 \end{pmatrix}, \quad \mathbf{x} = \begin{pmatrix} x \\ y \\ z \\ w \end{pmatrix}, \quad \mathbf{b} = \begin{pmatrix} 0 \\ 9 \\ 16 \end{pmatrix}$$

a. **(6p)** Use Gaussian elimination to solve the linear system when $a = 0$. Mark the pivot positions.

b. **(6p)** Determine all values of a such that the linear system is consistent.

c. **(6p)** Express the vector $\mathbf{w} = (2,1,0)$ as a linear combination of the four column vectors of A for all values of a where this is possible.

For a complete solution manual, see Eksamen MET1180 12/2021, Oppgave 3.

Optional: Exercises from the Norweigan textbook

Textbook [E]:	Eriksen, *Matematikk for økonomi og finans*
Exercise book [O]:	Eriksen, *Matematikk for økonomi og finans - Oppgaver og Løsningsforslag*

Exercises:	[E] 6.5.2
Solution manual:	See [O] Kap. 6.5