Section 1.5, exercise 9c) Find the inverse of the following 4×4 matrix, where k is nonzero.

$$\begin{bmatrix} k & 0 & 0 & 0 \\ 1 & k & 0 & 0 \\ 0 & 1 & k & 0 \\ 0 & 0 & 1 & k \end{bmatrix}$$

Section 1.6, exercise 4 Solve the system by inverting the coefficient matrix and using Theorem 1.6.2. (If A is an invertible $n \times n$ matrix, then for each $n \times 1$ matrix $\mathbf{b}$, the system of equations $A\mathbf{x} = \mathbf{b}$ has exactly one solution, namely, $\mathbf{x} = A^{-1}\mathbf{b}$.)

$$\begin{array}{rcrcrcr} 5x_1 & + & 3x_2 & + & 2x_3 & = & 4 \\ 3x_1 & + & 3x_2 & + & 2x_3 & = & 2 \\ & & x_2 & + & x_3 & = & 5 \end{array}$$

Section 1.6, exercise 12 Solve the system in all parts simultaneously. (Utvid koeffisientmatrisen med to kolonner bestående av konstranter som henholdsvis tilsvarer deloppgave a) og b). Utfør deretter Gauss-Jordan eliminasjon.)

$$\begin{array}{rcrcrcr} -x_1 & + & 4x_2 & + & x_3 & = & b_1 \\ x_1 & + & 9x_2 & - & 2x_3 & = & b_2 \\ 6x_1 & + & 4x_2 & - & 8x_3 & = & b_3 \end{array}$$

a) $b_1 = 0, \quad b_2 = 1, \quad b_3 = 0$ b) $b_1 = -3, \quad b_2 = 4, \quad b_3 = -5$

Section 1.6, exercise 17 Find conditions that the b's must satisfy for the system to be consistent.

$$\begin{array}{rcrcrcr} x_1 & - & 2x_2 & + & 5x_3 & = & b_1 \\ 4x_1 & - & 5x_2 & + & 8x_3 & = & b_2 \\ -3x_1 & + & 3x_2 & - & 3x_3 & = & b_3 \end{array}$$

Section 1.7, exercise 4 Which of the following matrices are symmetric?

a) $\begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 4 \\ 4 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 2 & -1 & 3 \\ -1 & 5 & 1 \\ 3 & 1 & 7 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 2 & 0 \\ 3 & 0 & 0 \end{bmatrix}$

Section 10.2, exercise 39a Find A^{-1}, and check your result by showing that $AA^{-1} = A^{-1}A = I$. (Utfør Gauss-Jordan eliminasjon på matrisen $[A \quad I]$.)

$$A = \begin{bmatrix} 1 & 1+i & 0 \\ 0 & 1 & i \\ -i & 1-2i & 2 \end{bmatrix}$$