Student number: _____
Surname: _____
First name: _____

This assignment consists of THREE pages and covers topics from unit 1 of the course. Please make sure that you answer and submit all pages.

1. State whether the following matrices are in row-echelon form (REF), reduced row-echelon form (RREF), both or neither.

$$(a)\quad \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}, \qquad (b)\quad \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \qquad (c)\quad \begin{bmatrix} 1 & 1 & 4 \\ 0 & 0 & 1 \end{bmatrix} \qquad (d)\quad \begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

2. Solve the system of linear equations using <u>elimination</u>:

$$\begin{aligned} x - y &= 2 \\ 2x - 3y &= 1 \end{aligned}$$

3. Solve the following systems of linear equations.

$$\begin{aligned} x_1 + 4x_2 - 2x_3 + 3x_5 &= 0 \\ 2x_1 + 8x_2 - 5x_3 - 2x_4 + 6x_5 - 3x_6 &= -1 \\ 5x_3 + 10x_4 + 15x_6 &= 5 \end{aligned}$$

4. Find the equation of a parabola that passes through the points $(2, \frac{1}{2})$, $(-1, 2)$ and $(0, -\frac{1}{2})$. Do this by first assuming the parabola has the form $y = ax^2 + bx + c$ then write out the linear system of equations that you need to solve. Write this as an augmented matrix and use Gauss-Jordan elimination to solve for a, b and c.