1. Let A be the matrix

$$A = \begin{pmatrix} 3 & 1 \\ 2 & 1 \end{pmatrix}.$$

If $f(x) = x^3 - 2x + 4$, then find $f(A)$.

2. What conditions must b_1, b_2, and b_3 satisfy in order for the system of equations

$$
\begin{aligned}
x_1 + x_2 + 2x_3 &= b_1 \\
x_1 \quad\;\; + x_3 &= b_2 \\
2x_1 + x_2 + 3x_3 &= b_3
\end{aligned}
$$

to be consistent.

3. Evaluate the following determinant by reducing to row echelon form.

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

4. Solve the following system of linear equations by using Cramer's rule

$$
\begin{aligned}
4x + 5y \quad\;\; &= 2 \\
11x + y + 2z &= 3 \\
x + 5y + 2z &= 1.
\end{aligned}
$$

5. Determine whether the vectors $v_1 = (2, -1, 3)$, $v_2 = (4, 1, 2)$, and $v_3 = (8, -1, 8)$ span $\Re^3$.

6. Determine whether the following vectors in $\Re^3$

$v_1 = (-3, 0, 4)$, $v_2 = (5, -1, 2)$, and $v_3 = (1, 1, 3)$ form a linearly independent set or linearly dependent set.