1. (6 points) Check all of the following that are correct statements

- The equation \( x_1 + y = z \) is a linear equation in the variables \( y \) and \( z \).
- The equation \( x_1 \cdot x + y = z \) is a linear equation in the variables \( x, y, \) and \( z \).
- The equation \( x_1 \cdot y = z \) is a linear equation in the variables \( x_1, y, \) and \( z \).
- The matrix
  \[
  \begin{bmatrix}
  1 & 0 & 0 \\
  0 & 1 & 0 \\
  0 & 0 & 2 \\
  \end{bmatrix}
  \]
  is in a reduced echelon form.
- The matrix
  \[
  \begin{bmatrix}
  1 & 0 & 0 \\
  0 & 0 & 0 \\
  0 & 1 & 0 \\
  0 & 0 & 1 \\
  \end{bmatrix}
  \]
  is in a reduced echelon form.
- The matrix
  \[
  \begin{bmatrix}
  1 & 0 & 1 & 0 \\
  0 & 1 & 1 & 0 \\
  0 & 0 & 0 & 2 \\
  \end{bmatrix}
  \]
  is in a reduced echelon form.

2. (3 points) Is the following system consistent?

\[
\begin{align*}
x_1 + x_2 + 2x_3 &= 4 \\
x_1 + x_2 + x_3 &= 2 \\
x_1 + x_3 &= 1 \\
2x_2 + x_3 &= 3
\end{align*}
\]

**Solution:** Not the system is not consistent.

3. (5 points) Write the solution of the vector equation \( xa + yb + zc = d \) in the parametric form where

\[
\begin{align*}
a &= \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix},
\quad b &= \begin{bmatrix} 2 \\ 2 \\ 2 \end{bmatrix},
\quad c &= \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix},
\quad d &= \begin{bmatrix} 3 \\ 14 \\ 13 \end{bmatrix}
\end{align*}
\]

**Solution:**

\[
\begin{align*}
x &= 2 \\
y &= 1 \\
z &= 5
\end{align*}
\]