1. Suppose that \( x_1 = c_1, \ldots, x_n = c_n \) is a solution of the linear system

\[
\begin{align*}
    a_{11} x_1 + \cdots + a_{1n} x_n &= b_1, \\
    &\vdots \\
    a_{m1} x_1 + \cdots + a_{mn} x_n &= b_m.
\end{align*}
\]

Under what circumstances is \( x_1 = 2c_1, \ldots, x_n = 2c_n \) also a solution?

2. Give a geometric description of the set of all solutions for each of the following linear systems.

   (a) \[0x + 0y + z = 0.\]

   (b) \[0x + 0y + z = 0, \quad 0x + y + 0z = 0.\]

   (c) \[0x + 0y + z = 0, \quad 0x + y + 0z = 0, \quad x + 0y + 0z = 0.\]

   (d) \[0x + 0y + z = 0, \quad 0x + y + 0z = 0, \quad x + 0y + 0z = 0, \quad x + y + z = 0.\]

   (e) \[0x + 0y + z = 0, \quad 0x + y + 0z = 0, \quad x + 0y + 0z = 0, \quad x + y + z = 1.\]