1. Solution: we assume that the homogenous coordinate is \((x_1, x_2, x_3)\), then
\[
x = \frac{x_1}{x_3}, \quad y = \frac{x_2}{x_3}
\]
Then, the line \(l: x - 3y + 4 = 0\) can be rewritten as \(x_1 - 3x_2 + 4x_3 = 0\). Thus, the coordinate of the line \(l\) is \((1, -3, 4)\).

The coordinate of the infinity line is \((0, 0, 1)\).

Then, the infinity point of the line \(l\) actually is the intersection point \(p\) of line \(l\) with the infinity line. \(p\) can be obtained by
\[
(1, -3, 4)^T \times (0, 0, 1)^T = (-3, -1, 0)^T
\]
Since only ratio is important for homogeneous coordinate, the infinity point can be strictly written as \(k (-3, -1, 0)^T\), where \(k\) is any non-zero number.

2. Proof: \(A, B, C\) and \(D\) are coplanar \(\iff\) vectors \(\overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{AD}\) are coplanar \(\iff\) their mixed product is zero, that is \((\overrightarrow{AB}, \overrightarrow{AC}, \overrightarrow{AD}) = 0\)
\[
\overrightarrow{AB} = (x_2 - x_1, y_2 - y_1, z_2 - z_1)^T, \overrightarrow{AC} = (x_3 - x_1, y_3 - y_1, z_3 - z_1)^T, \overrightarrow{AD} = (x_4 - x_1, y_4 - y_1, z_4 - z_1)^T
\]
Then,
\[
\begin{vmatrix}
  x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\
  x_3 - x_1 & y_3 - y_1 & z_3 - z_1 \\
  x_4 - x_1 & y_4 - y_1 & z_4 - z_1 \\
  x_1 & y_1 & z_1
\end{vmatrix} = 0
\]
Then, according to the property of the determinant,
\[
\begin{vmatrix}
  x_2 & y_2 & z_2 & 0 \\
  x_3 & y_3 & z_3 & 0 \\
  x_4 & y_4 & z_4 & 0 \\
  x_1 & y_1 & z_1 & 1
\end{vmatrix} = 0 \quad \text{(then, add the fourth row to the rows 1, 2, 3)}
\]
we have
\[
\begin{vmatrix}
  x_2 & y_2 & z_2 & 1 \\
  x_3 & y_3 & z_3 & 1 \\
  x_4 & y_4 & z_4 & 1 \\
  x_1 & y_1 & z_1 & 1
\end{vmatrix} = 0 \iff
\begin{vmatrix}
  x_1 & y_1 & z_1 & 1 \\
  x_2 & y_2 & z_2 & 1 \\
  x_3 & y_3 & z_3 & 1 \\
  x_4 & y_4 & z_4 & 1
\end{vmatrix} = 0
\]