5.2 Solve by means of Gaussian elimination
You should indicate the decomposition **PA=LU**

$$\begin{cases} 4x_1 + 5x_2 + 6x_3 = 28 \\ 2x_1 - 7x_3 = 29 \\ -5x_1 - 8x_2 = -64 \end{cases} \xrightarrow{L_1 \leftrightarrow L_3} \left[\begin{array}{ccc|c} -5 & -8 & 0 & -64 \\ 2 & 0 & -7 & 29 \\ 4 & 5 & 6 & 28 \end{array}\right] \xrightarrow[L_3 \leftarrow L_3 + \frac{4}{5}L_1]{L_2 \leftarrow L_2 + \frac{2}{5}L_1} \left[\begin{array}{ccc|c} -5 & -8 & 0 & -64 \\ 0 & -\frac{16}{5} & -7 & \frac{17}{5} \\ 0 & -\frac{7}{5} & 6 & -\frac{116}{5} \end{array}\right]$$

$$\xrightarrow{L_3 \leftarrow L_3 - \frac{7}{16}L_2} \left[\begin{array}{ccc|c} 5 & -8 & 0 & 64 \\ 0 & -\frac{16}{5} & -7 & \frac{17}{5} \\ 0 & 0 & \frac{47}{16} & \frac{395}{16} \end{array}\right]$$

P A L U

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix} \times \begin{bmatrix} 4 & 5 & 6 \\ 2 & 0 & -1 \\ -5 & -8 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ -\frac{2}{5} & 1 & 0 \\ -\frac{4}{5} & \frac{7}{16} & 1 \end{bmatrix} \times \begin{bmatrix} 5 & -8 & 0 \\ 0 & -\frac{16}{5} & -7 \\ 0 & 0 & \frac{47}{16} \end{bmatrix}$$