Punto 4.

Sistema triangular inferior:

$$\begin{pmatrix} a_{11} & 0 & 0 & \cdots & 0 \\ a_{21} & a_{22} & 0 & \cdots & 0 \\ a_{31} & a_{32} & a_{33} & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{nn} \end{pmatrix} \vec{x} = \vec{b}$$

$$\Downarrow$$

$$\text{Fila } i \rightarrow \begin{pmatrix} a_{11} & 0 & 0 & \cdots & 0 & \cdots & 0 \\ a_{21} & a_{22} & 0 & \cdots & 0 & \cdots & 0 \\ a_{31} & a_{32} & a_{33} & \cdots & 0 & \cdots & 0 \\ \vdots & \vdots & \vdots & & \vdots & & \vdots \\ a_{i1} & a_{i2} & a_{i3} & \cdots & a_{ii} & \cdots & 0 \\ \vdots & \vdots & \vdots & & \vdots & & \vdots \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{ni} & \cdots & a_{nn} \end{pmatrix} \vec{x} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ \vdots \\ b_i \\ \vdots \\ b_n \end{pmatrix}$$

(Columna i)

$$a_{11}x_1 = b_1$$

$$a_{21}x_1 + a_{22}x_2 = b_2$$

$$a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = b_3$$

$$a_{i1}x_1 + a_{i2}x_2 + a_{i3}x_3 + \cdots + a_{ii}x_i = b_i$$

Si despejamos x_i

$$a_{ii}x_i = b_i - a_{i1}x_1 - a_{i2}x_2 - a_{i3}x_3 - \cdots - a_{ii-1}x_{i-1}$$

$$a_{ii}x_i = b_i - \sum_{j=1}^{i-1} a_{ij}x_j$$

Punto 5:

Sistema triangular superior:

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1i} & \cdots & a_{1n} \\ 0 & a_{22} & a_{23} & \cdots & a_{2i} & \cdots & a_{2n} \\ 0 & 0 & a_{33} & \cdots & a_{3i} & \cdots & a_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots & & \vdots \\ 0 & 0 & 0 & \cdots & a_{ii} & \cdots & a_{in} \\ \vdots & \vdots & \vdots & & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & \cdots & 0 & \cdots & a_{nn} \end{pmatrix} \rightarrow X = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ \vdots \\ b_i \\ \vdots \\ b_n \end{pmatrix}$$

$$a_{ii}X_i + a_{i(i+1)}X_{i+1} + a_{i(i+2)}X_{i+2} + \cdots + a_{in}X_n = b_i$$

Despejando X_i:

$$a_{ii}X_i = b_i - a_{i(i+1)}X_{i+1} - a_{i(i+2)}X_{i+2} - \cdots - a_{in}X_n$$

$$a_{ii}X_i = b_i - \sum_{j=i+1}^{n} a_{ij}X_j$$

$$X_i = \frac{b_i - \sum_{j=i+1}^{n} a_{ij}X_j}{a_{ii}}$$