Step-1

Block multiplication is

$$\begin{bmatrix} A & B \end{bmatrix}\begin{bmatrix} C \\ D \end{bmatrix} = \begin{bmatrix} AC + BD \end{bmatrix}$$

Block multiplication says that elimination on column 1 produces

$$EA = \begin{bmatrix} 1 & \mathbf{0} \\ \dfrac{-\mathbf{c}}{a} & I \end{bmatrix}\begin{bmatrix} a & \mathbf{b} \\ \mathbf{c} & D \end{bmatrix}$$

$$= \begin{bmatrix} a & \mathbf{b} \\ \dfrac{-\mathbf{c}}{a}(a) + \mathbf{c} & \dfrac{-\mathbf{c}}{a}.\mathbf{b} + 1.D \end{bmatrix}$$

$$= \begin{bmatrix} a & \mathbf{b} \\ \mathbf{0} & \boxed{\dfrac{-\mathbf{cb}}{a} + D} \end{bmatrix}$$