Given matrix x, b, and arbitrary c (x.c <> 0), find a such that ax=b

$$x := \begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix} \qquad b := \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \qquad c := \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}$$

$$x \cdot c = 1 \qquad b \cdot c^{T} = \begin{bmatrix} 2 & -1 & 1 \\ 4 & -2 & 2 \\ 6 & -3 & 3 \end{bmatrix}$$

$$a := \frac{b \cdot c^{T}}{x \cdot c} \qquad a = \begin{bmatrix} 2 & -1 & 1 \\ 4 & -2 & 2 \\ 6 & -3 & 3 \end{bmatrix}$$

(Check solution ax=b)

$$a \cdot x = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

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$$x := \begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix} \qquad b := \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \qquad c := \begin{bmatrix} 0 \\ -1 \\ 2 \end{bmatrix}$$

$$x \cdot c = 1 \qquad b \cdot c^{T} = \begin{bmatrix} 0 & -1 & 2 \\ 0 & -2 & 4 \\ 0 & -3 & 6 \end{bmatrix}$$

$$a := \frac{b \cdot c^{T}}{x \cdot c} \qquad a = \begin{bmatrix} 0 & -1 & 2 \\ 0 & -2 & 4 \\ 0 & -3 & 6 \end{bmatrix}$$

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$$x \cdot c = 1 \qquad b \cdot c^{T} = \begin{bmatrix} 1 & -2 & 3 \\ 2 & -4 & 6 \\ 3 & -6 & 9 \end{bmatrix}$$

$$a := \frac{b \cdot c^{T}}{x \cdot c} \qquad a = \begin{bmatrix} 1 & -2 & 3 \\ 2 & -4 & 6 \\ 3 & -6 & 9 \end{bmatrix}$$

(Check solution ax=b)

$$a \cdot x = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$