

We have an equation:

$$\begin{pmatrix} a & c \\ b & d \end{pmatrix} \cdot \begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix} = \begin{pmatrix} 2 & 1 \\ -1 & 0 \end{pmatrix}$$

So solve this let's firstly find inverse matrix to $\begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix}$.

$$\begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix}^{-1} = \begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ 1 & 0 \end{pmatrix}$$

Now, let's multiply both parts of equation by inverse matrix:

$$\begin{pmatrix} a & c \\ b & d \end{pmatrix} \cdot \begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix}^{-1} = \begin{pmatrix} 2 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 2 & -1 \end{pmatrix}^{-1}$$

$$\begin{pmatrix} a & c \\ b & d \end{pmatrix} = \begin{pmatrix} 2 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 2 & 1 \\ -\frac{1}{2} & -\frac{1}{2} \end{pmatrix}$$

So

$$\begin{pmatrix} a & c \\ b & d \end{pmatrix} = \begin{pmatrix} 2 & 1 \\ -\frac{1}{2} & -\frac{1}{2} \end{pmatrix}$$