

Fill in the Blanks

Inverse of a Linear Transformation

Transformation Matrix M	Det M	Inverse Matrix M^{-1}	Image Coords	Matrix Calculation	Object Coords
$\begin{pmatrix} 2 & 1 \\ -1 & 3 \end{pmatrix}$	7	$\frac{1}{7} \begin{pmatrix} 3 & -1 \\ 1 & 2 \end{pmatrix}$	(8, 3)	$\frac{1}{7} \begin{pmatrix} 3 & -1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} 8 \\ 3 \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$	(3, 2)
$\begin{pmatrix} -1 & 0 \\ 4 & 2 \end{pmatrix}$	-2	$-\frac{1}{2} \begin{pmatrix} 2 & 0 \\ -4 & -1 \end{pmatrix}$	(-2, -2)	$-\frac{1}{2} \begin{pmatrix} 2 & 0 \\ -4 & -1 \end{pmatrix} \begin{pmatrix} -2 \\ -2 \end{pmatrix} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$	(2, -5)
$\begin{pmatrix} 1 & -3 \\ 0 & -1 \end{pmatrix}$	-1	$-1 \begin{pmatrix} -1 & 3 \\ 0 & 1 \end{pmatrix}$	(-5, -3)	$-1 \begin{pmatrix} -1 & 3 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} -5 \\ -3 \end{pmatrix} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$	(4, 3)
$\begin{pmatrix} -3 & 0 \\ 0 & 2 \end{pmatrix}$	-6	$-\frac{1}{6} \begin{pmatrix} 2 & 0 \\ 0 & -3 \end{pmatrix}$	(3, 14)	$-\frac{1}{6} \begin{pmatrix} 2 & 0 \\ 0 & -3 \end{pmatrix} \begin{pmatrix} 3 \\ 14 \end{pmatrix} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$	(-1, 7)
$\begin{pmatrix} 3 & -2 \\ -1 & 4 \end{pmatrix}$	10	$\frac{1}{10} \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$	(15, -5)	$\frac{1}{10} \begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 15 \\ -5 \end{pmatrix} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}$	(5, 0)
$\begin{pmatrix} -5 & 0 \\ 1 & -1 \end{pmatrix}$	5	$\frac{1}{5} \begin{pmatrix} -1 & 0 \\ -1 & -5 \end{pmatrix}$	(-10, 5)	$\frac{1}{5} \begin{pmatrix} -1 & 0 \\ -1 & -5 \end{pmatrix} \begin{pmatrix} -10 \\ 5 \end{pmatrix} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$	(2, -3)
$\begin{pmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ -1 & 3 & 1 \end{pmatrix}$	-6	$-\frac{1}{6} \begin{pmatrix} 1 & -3 & 1 \\ -2 & 0 & -2 \\ 7 & -3 & 1 \end{pmatrix}$	(2, 6, -2)	$-\frac{1}{6} \begin{pmatrix} 1 & -3 & 1 \\ -2 & 0 & -2 \\ 7 & -3 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 6 \\ -2 \end{pmatrix} = \begin{pmatrix} 3 \\ 0 \\ 1 \end{pmatrix}$	(3, 0, 1)
$\begin{pmatrix} 0 & 2 & -1 \\ -2 & 3 & 1 \\ 1 & -1 & 0 \end{pmatrix}$	3	$\frac{1}{3} \begin{pmatrix} 1 & 1 & 5 \\ 1 & 1 & 2 \\ -1 & 2 & 4 \end{pmatrix}$	(6, 16, -5)	$\frac{1}{3} \begin{pmatrix} 1 & 1 & 5 \\ 1 & 1 & 2 \\ -1 & 2 & 4 \end{pmatrix} \begin{pmatrix} 6 \\ 16 \\ -5 \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \\ 2 \end{pmatrix}$	(-1, 4, 2)