Fill in the Blanks — Solving Simultaneous Equations Using Matrices

Simultaneous Equations	Matrix Equation	Inverse Matrix	Inverse Matrix Equation	Solutions
$x+2y+z=11$ $3x-y+2z=4$ $2x+3y-z=15$	$\begin{pmatrix}1&2&1\\3&-1&2\\2&3&-1\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}11\\4\\15\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}\\\frac{7}{20}&-\frac{3}{20}&\frac{1}{20}\\\frac{11}{20}&\frac{1}{20}&-\frac{7}{20}\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}\\\frac{7}{20}&-\frac{3}{20}&\frac{1}{20}\\\frac{11}{20}&\frac{1}{20}&-\frac{7}{20}\end{pmatrix}\begin{pmatrix}11\\4\\15\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=2$ $y=4$ $z=1$
$x+y-z=-1$ $3x+2z=4$ $-x-2y+3z=3$	$\begin{pmatrix}1&1&-1\\3&0&2\\-1&-2&3\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}-1\\4\\3\end{pmatrix}$	$\begin{pmatrix}-4&1&-2\\11&-2&5\\6&-1&3\end{pmatrix}$	$\begin{pmatrix}-4&1&-2\\11&-2&5\\6&-1&3\end{pmatrix}\begin{pmatrix}-1\\4\\3\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=2$ $y=-4$ $z=-1$
$2x+2y+z=2$ $-x+3y-z=15$ $3x-y+z=-13$	$\begin{pmatrix}2&2&1\\-1&3&-1\\3&-1&1\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}2\\15\\-13\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{4}&\frac{3}{8}&\frac{5}{8}\\\frac{1}{4}&\frac{1}{8}&-\frac{1}{8}\\1&-1&-1\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{4}&\frac{3}{8}&\frac{5}{8}\\\frac{1}{4}&\frac{1}{8}&-\frac{1}{8}\\1&-1&-1\end{pmatrix}\begin{pmatrix}2\\15\\-13\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=-3$ $y=4$ $z=0$
$2x+y+z=6$ $4x+2y-z=-3$ $x-y+3z=11$	$\begin{pmatrix}2&1&1\\4&2&-1\\1&-1&3\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}6\\-3\\11\end{pmatrix}$	$\begin{pmatrix}-\frac{5}{9}&\frac{4}{9}&\frac{1}{3}\\\frac{13}{9}&-\frac{5}{9}&-\frac{2}{3}\\\frac{2}{3}&-\frac{1}{3}&0\end{pmatrix}$	$\begin{pmatrix}-\frac{5}{9}&\frac{4}{9}&\frac{1}{3}\\\frac{13}{9}&-\frac{5}{9}&-\frac{2}{3}\\\frac{2}{3}&-\frac{1}{3}&0\end{pmatrix}\begin{pmatrix}6\\-3\\11\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=-1$ $y=3$ $z=5$
$-x+2y+z=9$ $5x+2y-3z=-15$ $3x-y+2z=-2$	$\begin{pmatrix}-1&2&1\\5&2&-3\\3&-1&2\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}9\\-15\\-2\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{50}&\frac{1}{10}&\frac{4}{25}\\\frac{19}{50}&\frac{1}{10}&-\frac{1}{25}\\\frac{11}{50}&-\frac{1}{10}&\frac{6}{25}\end{pmatrix}$	$\begin{pmatrix}-\frac{1}{50}&\frac{1}{10}&\frac{4}{25}\\\frac{19}{50}&\frac{1}{10}&-\frac{1}{25}\\\frac{11}{50}&-\frac{1}{10}&\frac{6}{25}\end{pmatrix}\begin{pmatrix}9\\-15\\-2\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=-2$ $y=2$ $z=3$
$2x+3y+z=5$ $-x-2y+4z=25$ $5x-y-z=0$	$\begin{pmatrix}2&3&1\\-1&-2&4\\5&-1&-1\end{pmatrix}\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}5\\25\\0\end{pmatrix}$	$\begin{pmatrix}\frac{3}{40}&\frac{1}{40}&\frac{7}{40}\\\frac{19}{80}&-\frac{7}{80}&-\frac{9}{80}\\\frac{11}{80}&\frac{17}{80}&-\frac{1}{80}\end{pmatrix}$	$\begin{pmatrix}\frac{3}{40}&\frac{1}{40}&\frac{7}{40}\\\frac{19}{80}&-\frac{7}{80}&-\frac{9}{80}\\\frac{11}{80}&\frac{17}{80}&-\frac{1}{80}\end{pmatrix}\begin{pmatrix}5\\25\\0\end{pmatrix}=\begin{pmatrix}x\\y\\z\end{pmatrix}$	$x=1$ $y=-1$ $z=6$