# Fill in the Blanks — Solving Simultaneous Equations Using Matrices

| Simultaneous Equations | Matrix Equation | Inverse Matrix | Inverse Matrix Equation | Solutions |
|---|---|---|---|---|
| $x + 2y + z = 11$<br>$3x - y + 2z = 4$<br>$2x + 3y - z = 15$ | $\begin{pmatrix} 1 & 2 & 1 \\ 3 & -1 & 2 \\ 2 & 3 & -1 \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 11 \\ 4 \\ 15 \end{pmatrix}$ | $\begin{pmatrix} -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} \\ \frac{7}{20} & -\frac{3}{20} & \frac{1}{20} \\ \frac{11}{20} & \frac{1}{20} & -\frac{7}{20} \end{pmatrix}$ | $\begin{pmatrix} -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} \\ \frac{7}{20} & -\frac{3}{20} & \frac{1}{20} \\ \frac{11}{20} & \frac{1}{20} & -\frac{7}{20} \end{pmatrix}\begin{pmatrix} 11 \\ 4 \\ 15 \end{pmatrix} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ | |
| $x + y - z = -1$<br>$3x + 2z = 4$<br>$-x - 2y + 3z = 3$ | | | | |
| $2x + 2y + z = 2$<br>$-x + 3y - z = 15$<br>$3x - y + z = -13$ | | | | |
| $2x + y + z = 6$<br>$4x + 2y - z = -3$<br>$x - y + 3z = 11$ | | | | |
| $-x + 2y + z = 9$<br>$5x + 2y - 3z = -15$<br>$3x - y + 2z = -2$ | | | | |
| $2x + 3y + z = 5$<br>$-x - 2y + 4z = 25$<br>$5x - y - z = 0$ | | | | |