

Exercise 25

Find an equation involving g , h , and k that makes this augmented matrix correspond to a consistent system:

$$\left[\begin{array}{ccc|c} 1 & -4 & 7 & g \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$$

Solution

The aim is to put this augmented matrix in triangular form.

$$\left[\begin{array}{ccc|c} 1 & -4 & 7 & g \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$$

Multiply the first row by 2 and add it to the third row.

$$\left[\begin{array}{ccc|c} 1 & -4 & 7 & g \\ 0 & 3 & -5 & h \\ 0 & -3 & 5 & k + 2g \end{array} \right]$$

Add the second row to the third row.

$$\left[\begin{array}{ccc|c} 1 & -4 & 7 & g \\ 0 & 3 & -5 & h \\ 0 & 0 & 0 & k + 2g + h \end{array} \right]$$

For a solution to the system to exist (that is, for the system to be consistent), it must be the case that

$$k + 2g + h = 0.$$