

$$\begin{aligned}x + y + z &= 8 \\ax - y &= 3 \\-x + 3y + 4z &= b\end{aligned}$$

- a) There is no unique solution to the system of equations. Find the value of a .
 b) Given that the system can be solved, find the value of b .

$$\begin{aligned}a) \quad & x + y + z = 8 && A \\ & ax - y = 3 && B \\ & -x + 3y + 4z = b && C \\ & 4 \times A \quad 4x + 4y + 4z = 32 \\ & 4 \times A - C \quad 5x + y = 32 - b\end{aligned}$$

$$\begin{aligned} & ax - y = 3 && B \\ & 5x + y = 32 - b && 4 \times A - C\end{aligned}$$

Equate the coefficients of y

$$-1 \times B$$

$$\begin{aligned}-ax + y &= -3 \\ 5x + y &= 32 - b \\ a &= -5\end{aligned}$$

b)

$$\begin{aligned}5x + y &= -3 \\ 5x + y &= 32 - b\end{aligned}$$

Given that the system can be solved

$$\begin{aligned}-3 &= 32 - b \\ b &= 35\end{aligned}$$