1. Use Cramer's rule to find the solution of the system:

$$\begin{aligned} 3x + 5y &= 1 \\ 7x + 8y &= 1 \end{aligned}$$

2. Use Cramer's rule to find the solution of the system:

$$\begin{aligned} 17x + 7y + 7z &= 1 \\ 7x + 17y + 7z &= 0 \\ 7x + 7y + 17z &= 0 \end{aligned}$$

3. It is known that, for some missing value of a, the system:

$$\begin{aligned} ax - z &= 1 \\ 3x + y - w &= 0 \\ x + 2z + 2w &= 0 \\ -x + 2y + 5w &= 0 \end{aligned}$$

is inconsistent. Find the missing value of a.

4. Let

$$\begin{aligned} \vec{u} &= 5\vec{i} - 3\vec{j} - 4\vec{k} \\ \vec{v} &= -2\vec{i} + \vec{j} + 2\vec{k} \\ \vec{w} &= -4\vec{i} + \vec{j} + a\vec{k} \end{aligned}$$

(a) What value(s) of a make the vectors $\vec{u}$, $\vec{v}$ and $\vec{w}$ linearly dependent?

(b) Pick a value for a that makes the vectors $\vec{u}$, $\vec{v}$ and $\vec{w}$ linearly dependent. Then express one of the three vectors as a linear combination of the other two.

(c) Pick a value for a that makes the vectors $\vec{u}$, $\vec{v}$ and $\vec{w}$ linearly dependent. Give a geometric description of all linear combinations of $\vec{u}$, $\vec{v}$ and $\vec{w}$.

(d) Pick a value for a that makes the vectors $\vec{u}$, $\vec{v}$ and $\vec{w}$ linearly independent. Give a geometric description of all linear combinations of $\vec{u}$, $\vec{v}$ and $\vec{w}$.