

Directions: You may work to solve these problems in groups, but all written work must be your own. Show all work; no credit for solutions without work..

1. [1.1.38] Suppose a , b , c , and d are constants such that a is nonzero and the system below is consistent for all possible values of f and g . What can you say about the numbers a , b , c , and d ? Justify your answer.

$$\begin{aligned} ax_1 + bx_2 &= f \\ cx_1 + dx_2 &= g \end{aligned}$$

2. [1.2.{7-11}] Find the general solutions of the systems whose augmented matrices are given below.

(a) $\begin{bmatrix} 1 & 3 & 4 & 7 \\ 3 & 9 & 7 & 6 \end{bmatrix}$

(b) $\begin{bmatrix} 1 & 4 & 0 & 7 \\ 2 & 7 & 0 & 11 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 1 & -6 & 5 \\ 1 & -2 & 7 & -4 \end{bmatrix}$

(d) $\begin{bmatrix} 1 & -2 & -1 & 3 \\ 3 & -6 & -2 & 2 \end{bmatrix}$

(e) $\begin{bmatrix} 3 & -4 & 2 & 0 \\ -9 & 12 & -6 & 0 \\ -6 & 8 & -4 & 0 \end{bmatrix}$

(f) $\begin{bmatrix} 1 & -7 & 0 & 6 & 5 \\ 0 & 0 & 1 & -2 & -3 \\ -1 & 7 & -4 & 2 & 7 \end{bmatrix}$

3. Determine a cubic polynomial $f(t) = a + bt + ct^2 + dt^3$ such that $f(-1) = -1$, $f(0) = 0$, $f(1) = 1$, and $f'(1) = 0$. Hint: use the four given pieces of information about f to write four linear equations in the variables a , b , c , and d .