Some Exercises in Linear Algebra

- 1. Each of the following systems of equations has a unique solution. For the first system, there is exactly one value of x and one value of y which satisfy both equations simultaneously. Similarly, there is just one value of x, one value of y and one value of z which satisfy the second set of equations simultaneously. Can you find the solutions in each case?
 - (a) x y = 5 3x + 2y = 10(b) x - y + z = 6 2x + y = 3x - 3z = -7
- 2. Neither of the following systems has a solution. Can you prove this?
 - (a) x y = 5 3x - 3y = 10(b) x - y + z = 6 2x - y - 2z = -2x - 3z = -7
- 3. Each of the following systems has infinitely many solutions. In the first system, there are infinitely many values of x and corresponding values of y which satisfy both equations simultaneously. Similarly, there are infinitely many values of x, y and z which satisfy the second set of equations simultaneously. Can you find a way to describe the solutions in each case?

(a)
$$x - y = 5$$

 $3x - 3y = 15$
(b) $x - y + z = 6$
 $-2x + y + 2z = 1$
 $x - 2y + 5z = 19$

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