Worksheet 1
January 23, 2008

1. The following 3x3 system of equations has exactly one solution. Find it. (Question 13, 1.1)

$$\begin{aligned} x_1 - 3x_3 &= 8 \\ 2x_1 + 2x_2 + 9x_3 &= 7 \\ x_2 + 5x_3 &= -2 \end{aligned}$$

2. Depending on the values of a and b, how many solutions do the following systems of equations have?

   (a)

$$\begin{aligned} 2x_1 + 3x_2 &= 7 \\ 4x_1 + ax_2 &= b \end{aligned}$$

   (b)

$$\begin{aligned} 2x_1 + 3x_2 - x_3 &= 7 \\ x_1 - 2x_2 + 5x_3 &= 2 \\ 5x_1 + 4x_2 + ax_3 &= b \end{aligned}$$

3. What must be true of a, b, c, d if for any f and g, the following system is consistent? (Question 28, section 1.1)

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

4. Find all solutions to the following system.

$$\begin{aligned} x_1 + 5x_2 + 3x_3 &= 1 \\ 3x_1 + 8x_2 + 4x_3 &= 6 \\ 2x_1 + 3_2 + 1x_3 &= 5 \end{aligned}$$