WORKSHEET #1, 8/28/07

MATH 54, FALL 2007

1. Find all solutions to the following systems of equations (use the systematic method demonstrated in lecture and section):

(a)

$$\left\{\begin{array}{rcrcl} 2x & + & 2y & = & 2 \\ x & + & y & = & 1 \end{array}\right\}$$

(b)

$$\left\{\begin{array}{rcrcl} 6x & + & 2y & = & 2 \\ 2x & - & y & = & 1 \end{array}\right\}$$

(c)

$$\left\{\begin{array}{rcrcl} 2x & + & 4y & = & 3 \\ 3x & + & 6y & = & 2 \end{array}\right\}$$

(d)

$$\left\{\begin{array}{rcrcrcl} x & + & 2y & & & = & -1 \\ 3x & + & y & + & z & = & 4 \\ x & & & + & z & = & 3 \end{array}\right\}$$

(e)

$$\left\{\begin{array}{rcrcrcl} x & + & 2y & + & 2z & = & 1 \\ 3x & + & 2y & + & 2z & = & 7 \\ x & + & y & + & z & = & 2 \end{array}\right\}$$

2. Sketch the systems of equations and their solutions in (a), (b), and (c) as subsets of the plane $\mathbb{R}^2$.

3. (cf. §1.1 #38a) Systems of equations in *triangular* form are particularly easy to solve. Solve the lower triangular system:

$$\left\{\begin{array}{rcrcrcrcl} x_1 & & & & & & & = & -3 \\ -3x_1 & + & x_2 & & & & & = & 14 \\ x_1 & + & 2x_2 & + & x_3 & & & = & 9 \\ -x_1 & + & 8x_2 & - & 5x_3 & + & x_4 & = & 33 \end{array}\right\}$$