1. (a) $\begin{bmatrix} 8 & -2 \\ 4 & 1 \end{bmatrix}\begin{bmatrix} -6 & 1/2 \\ 0 & 5 \end{bmatrix} = \begin{bmatrix} -48 & -6 \\ -24 & 7 \end{bmatrix}$

(b) $\frac{1}{2}\begin{bmatrix} -1 & 0 \\ 2 & -3 \\ 1 & 5 \end{bmatrix}\begin{bmatrix} 2 & -2 \\ 0 & 1 \end{bmatrix} = \frac{1}{2}\begin{bmatrix} -2 & 2 \\ 4 & -7 \\ 2 & 3 \end{bmatrix} = \begin{bmatrix} -1 & 1 \\ 2 & -7/2 \\ 1 & 3/2 \end{bmatrix}$

2. (a) $\begin{vmatrix} -2 & 1 \\ -1 & 6 \end{vmatrix} = -12 - (-1) = -11$

(b) $\begin{vmatrix} 2 & 1 & 5 \\ -1 & 6 & 3 \\ 2 & -4 & 2 \end{vmatrix}\begin{matrix} 2 & 1 \\ -1 & 6 \\ 2 & -4 \end{matrix} = \underline{(24+6+20)-(-2-24+60)}$

$= 16.$

3. $x = \dfrac{\begin{vmatrix} -2 & 2 & -3 \\ -1 & -1 & 1 \\ 4 & 4 & -4 \end{vmatrix}\begin{matrix} -2 & 2 \\ -1 & -1 \\ 4 & 4 \end{matrix}}{\begin{vmatrix} 1 & 2 & -3 \\ 1 & -1 & 1 \\ 3 & 4 & -4 \end{vmatrix}\begin{matrix} 1 & 2 \\ 1 & -1 \\ 3 & 4 \end{matrix}} = \dfrac{(-8+8+12)-(8-8+12)}{(4+6-12)-(-8+4+9)} = \dfrac{0}{-7} = 0$

$y = \dfrac{\begin{vmatrix} 1 & -2 & -3 \\ 1 & -1 & 1 \\ 3 & 4 & -4 \end{vmatrix}\begin{matrix} 1 & -2 \\ 1 & -1 \\ 3 & 4 \end{matrix}}{-7} = \dfrac{(4-6-12)-(8+4+9)}{-7} = \dfrac{-35}{-7} = 5$

$(0) - (5) + z = -1$

$z = 4$

$[x, y, z] = [0, 5, 4].$

4. $\begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ -2 \end{bmatrix}$, $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{-1}\begin{bmatrix} 5 & -3 \\ -2 & 1 \end{bmatrix}\begin{bmatrix} 10 \\ -2 \end{bmatrix} = (-1)\begin{bmatrix} 56 \\ -22 \end{bmatrix} = \begin{bmatrix} -56 \\ 22 \end{bmatrix}$

5. $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 & 1 & 2 \\ 1 & 1 & -1 \\ -2 & 0 & -1 \end{bmatrix}\begin{bmatrix} -4 \\ 14 \\ 7 \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \\ 1 \end{bmatrix}$

6. (a) $|4x+1| = 39$

$1 \leq (4x+1) \geq 0$

$4x+1 = 39$

$4x = 38$

$x = \underline{19}$

$\underline{\quad 2 \quad}$

$1 \leq (4x+1) < 0$

$-(4x+1) = 39$

$4x+1 = -39$

$4x = -40$

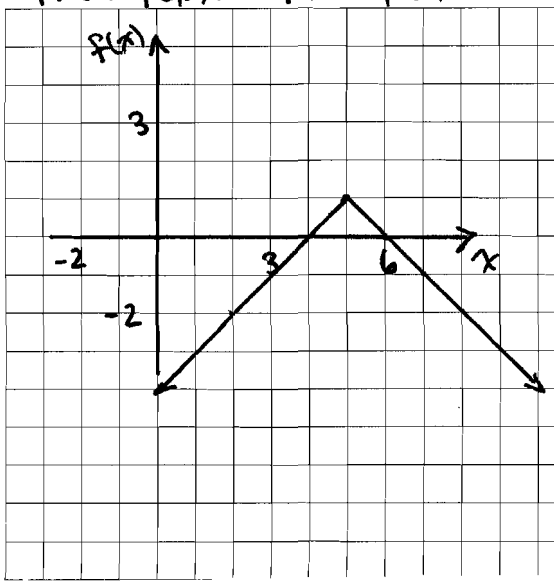
$x = -10$

(b) $14 - 5x > -6$

$-5x > -20$

$x < 4$

7. (a) $f(x) = -|x-5|+1$



(b) $x - y \leq 3$

$-y \leq -x + 3$

$y \geq x - 3$