Systems of EQ Review

1) Menu – 3-3-1-3

2) a) Substitution – Isolate a variable.
   Sub into other eq.

   b) Elimination

   c) Cramer's Rule

$3x - 5y = 22$
$4x + 2y = 12$

$\frac{2y}{2} = \frac{12}{2} - \frac{4x}{2}$

$y = 6 - 2x$

$y = 6 - 2(4)$
$y = 6 - 8$
$y = -2$

$(4, -2)$

$3x - 5(6 - 2x) = 22$

$3x - 30 + 10x = {}^{+30}22$

$\frac{13x}{13} = \frac{52}{13}$

$x = 4$

$x = 5$ ← changed to

$3x - 5y = 22$

$4x + 2y = 12$

$$x = \frac{\begin{vmatrix} 22 & -5 \\ 12 & 2 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 4 & 2 \end{vmatrix}} = \frac{44 + 60}{6 + 20} = \frac{104}{26} = 4$$

$$y = \frac{\begin{vmatrix} 3 & 22 \\ 4 & 12 \end{vmatrix}}{\begin{vmatrix} 3 & -5 \\ 4 & 2 \end{vmatrix}}$$

$3x - 5y = 22$
$4x + 2y = 12$

$[A] \cdot \begin{bmatrix} 3 & -5 \\ 4 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 22 \\ 12 \end{bmatrix} \cdot [A]^{-1}$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{6 - (-20)} \begin{bmatrix} 2 & 5 \\ -4 & 3 \end{bmatrix} \cdot \begin{bmatrix} 22 \\ 12 \end{bmatrix}$$

$$= \frac{1}{26} \begin{bmatrix} 44 + 60 \\ -88 + 36 \end{bmatrix}$$

$$= \frac{1}{26} \begin{bmatrix} 104 \\ -52 \end{bmatrix}$$

$$= \begin{bmatrix} 4 \\ -2 \end{bmatrix}$$

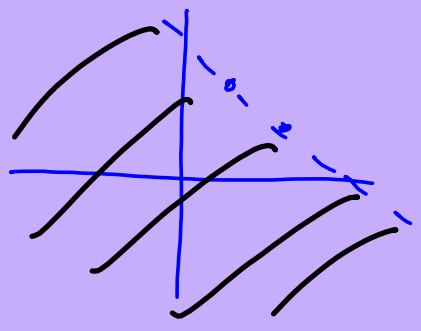
$(4, -2)$

f) $\frac{1}{3}x + \frac{1}{3}y = 5$

3./ Graph + Shade

0	0

$0 + 0 > 7$ F



$2x + 6y < 24$

$3x - 5y > -30$

12	0
0	4

$0 + 0 < 24$

ELIMINATION

$3x + y + z = -2$

$2x + 4y + z = 4$

$x + 3y + 2z = 12$

(1) $-3x - y - z = 2$

$+ \quad 2x + 4y + z = 4$

$-x + 3y = 6$

(5) $3(-3) + 3(1) + 2z = 12$

$-9 + 3 + 2z = 12$

$-6 + 2z = 12$

$+6 \quad +6$

$2z = 18$

$z = 9$

(2) $-4x - 8y - 2z = -8$

$x + 3y + 2z = 12$

$-3x - 5y = 4$

(4) $-x + 3(1) = 6$

$-x + 3 = 6$

$\frac{-x}{-1} = \frac{3}{-1}$

$x = -3$

(3) $-3[-x + 3y = 6]$

$-3x - 5y = 4$

$3x - 9y = -18$

$-3x - 5y = 4$

$\frac{-14y}{-14} = \frac{-14}{-14}$

$y = 1$

$(-3, 1, 9)$

6(b) Cramer's Rule

$$y = \frac{\begin{vmatrix} 2 & 4 & 6 \\ 3 & 17 & 2 \\ -1 & 25 & 4 \end{vmatrix}}{\begin{vmatrix} 2 & 1 & 6 \\ 3 & 4 & 2 \\ -1 & -2 & 4 \end{vmatrix}} = \frac{}{2\begin{vmatrix} 4 & -2 \\ -2 & 4 \end{vmatrix} - 1\begin{vmatrix} 3 & 2 \\ -1 & 4 \end{vmatrix} + 6\begin{vmatrix} 3 & 4 \\ -1 & 2 \end{vmatrix}}$$

$2(16-4)$

Calculator

$$\frac{\det([\ldots])}{\det([\ldots])}$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 11 \\ 12 \\ 13 \end{bmatrix}$$

$$= \begin{bmatrix} \_ & \_ & \_ \\ \_ & \_ & \_ \\ \_ & \_ & \_ \end{bmatrix}^{-1} \cdot \begin{bmatrix} \_ \\ \_ \\ \_ \end{bmatrix}$$