Systems of Equations Review

1) Solve by graphing on calculator.
   a) Graph 2 lines Standard form Menu-3-3-1-3
   b) Intersect

f) $3\left[\frac{1}{3}x+\frac{1}{3}y=5\right] \longrightarrow x+y=15$

Substitution

$5x-2y=-29 \Rightarrow \frac{5x}{2}+\frac{29}{2}=\frac{2y}{2}$

$3x+4y=19$ ← $\frac{5}{2}x+\frac{29}{2}=y$

$3x+2\left(\frac{5}{2}x+\frac{29}{2}\right)=19$

$3x+10x+58=19$

-58

$\frac{13x}{13}=\frac{-39}{13}$

$x=-3$

$y=\frac{5}{2}(-3)+\frac{29}{2}$

$=\frac{-15}{2}+\frac{29}{2}$

$=\frac{14}{2}=7$

$(-3,7)$

Matrix Eg

$$6x - y = 33$$
$$3x + 5y = -33$$

[X] [A]⁻¹

$$\begin{bmatrix} 6 & -1 \\ 3 & 5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 33 \\ -33 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{30+3} \begin{bmatrix} 5 & 1 \\ -3 & 6 \end{bmatrix} \cdot \begin{bmatrix} 33 \\ -33 \end{bmatrix}$$

$$= \frac{1}{33} \begin{bmatrix} 165 + -33 \\ -99 + -198 \end{bmatrix}$$

$$= \frac{1}{33} \begin{bmatrix} 132 \\ -297 \end{bmatrix}$$

$$= \begin{bmatrix} 4 \\ -9 \end{bmatrix}$$

$(4, -9)$

3/ Graph & Shade
Find where shaded regions intersect

4-5) Linear Prog.

3-Var. Elim

$7 \cdot 2x - y + 7z = 99$
$3x + 7y - 2z = 128$
$5x - 6y + 9z = 77$

Elim #1 & #2 – Elim. same variable.

$14x - 7y + 49z = 693$
$3x + 7y - 2z = 128$
$17x + 47z = 371$

$-12x + 7y - 42z = -144$
$5x - 6y + 9z = 77$
$-7x - 33z = -67$

$x = -\frac{73}{9}$ ← Changing to -8

$4x + 2y - 3z = -1$

$7x - y + 4z = 17$

$3x - 6y + 2z = -3$

CRAMER'S RULE

$$y = \frac{\begin{vmatrix} 4 & -1 & -3 \\ 7 & 17 & 4 \\ 3 & -3 & 2 \end{vmatrix}}{\begin{vmatrix} 4 & 2 & -3 \\ 7 & -1 & 4 \\ 3 & -6 & 2 \end{vmatrix}} =$$

$$4\begin{vmatrix} 17 & 4 \\ -3 & 2 \end{vmatrix} + 1\begin{vmatrix} 7 & 4 \\ 3 & 2 \end{vmatrix} - 3\begin{vmatrix} 7 & 17 \\ 3 & -3 \end{vmatrix}$$

$$4(34+12) + 1(14-12) - 3(-21-51)$$

$$184 + 2 + 2$$