

## SYSTEMS OF EQUATIONS REVIEW

$$x + 3y = 12$$

$$y = -\frac{2}{3}x - 5$$

Substitution

$$5x - 2y = -48 \implies$$

$$\frac{5x + 48}{2} = \frac{2y}{2}$$

$$3x + 4y = 18$$

$$\frac{5x + 48}{2} = y$$

$$3x + 2\left(\frac{5x + 48}{2}\right) = 18$$

$$y = \frac{5}{2}x + 24$$

$$3x + 10x + 96 = 18$$

$$= -15 + 24$$

$$\frac{13x}{13} = \frac{-78}{13}$$

$$= 9$$

$$x = -6$$

$$\boxed{(-6, 9)}$$

Matrix Equations

$$5x - 2y = -48$$

$$3x + 4y = 18$$

$$[A]^{-1} \begin{bmatrix} 5 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -48 \\ 18 \end{bmatrix} \cdot [A]^{-1}$$

Calculator

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

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{20 + 16} \begin{bmatrix} 4 & 2 \\ -3 & 5 \end{bmatrix} \cdot \begin{bmatrix} -48 \\ 18 \end{bmatrix}$$

$$= \frac{1}{26} \begin{bmatrix} -192 + 36 \\ +144 + 90 \end{bmatrix}$$

$$= \frac{1}{26} \begin{bmatrix} -156 \\ 234 \end{bmatrix} =$$

$$= \begin{bmatrix} -6 \\ 9 \end{bmatrix} \quad (-6, 9)$$

$$\begin{array}{l} -2 \\ 4 \end{array} \left[ \begin{array}{l} 2x + 4y - z = 7 \\ 3x - 5y - 2z = -13 \\ 7x + y + 4z = 21 \end{array} \right]$$

$$\textcircled{3} \left[ \begin{array}{l} -x - 13y = -27 \\ 15x + 17y = 49 \end{array} \right]$$

$$\begin{array}{r} -15x - 195y = -405 \\ 15x + 17y = 49 \end{array}$$

$$\begin{array}{r} -178y = -356 \\ -178 \end{array}$$

$$y = 2$$

$$x = 5/9$$

check  
substituting

$$\textcircled{1} \begin{array}{r} -4x - 8y + 2z = -14 \\ 3x - 5y - 2z = -13 \\ \hline -x - 13y = -27 \end{array}$$

$$\textcircled{2} \begin{array}{r} 8x + 16 - 4z = 28 \\ 7x + y + 4z = 21 \\ \hline 15x + 17y = 49 \end{array}$$

$$\textcircled{4} \begin{array}{r} -x - 13y = -27 \\ -x - 13(2) = -27 \\ -x - 26 = -27 \\ +27 \\ 1 = x \end{array}$$

$$\textcircled{5} \begin{array}{r} 2x + 4y - z = 7 \\ 2(1) + 4(2) - z = 7 \\ 2 + 8 - z = 7 \end{array}$$

$$10 - z = 7$$

$$3 = z$$

$$\boxed{(1, 2, 3)}$$

CRAMER'S RULE

$$2x + 4y - z = 7$$

$$3x - 5y - 2z = -13$$

$$7x + y + 4z = 21$$

$$z = \frac{\begin{vmatrix} 2 & 4 & 7 \\ 3 & -5 & -13 \\ 7 & 1 & 21 \end{vmatrix}}{\begin{vmatrix} 2 & 4 & -1 \\ 3 & -5 & -2 \\ 7 & 1 & 4 \end{vmatrix}} = 2 \begin{vmatrix} -5 & -2 \\ 1 & 4 \end{vmatrix} - 4 \begin{vmatrix} 3 & -2 \\ 7 & 4 \end{vmatrix} + -1 \begin{vmatrix} 3 & -5 \\ 7 & 1 \end{vmatrix}$$

$$2(-20 + 2) - 4(12 + 14) + -1(3 + 35)$$

$$2(-18) - 4(26) - 1(38)$$

$$-36 - 104 - 38 = \boxed{-178}$$

Calculator:

$$z = \frac{\det(\begin{bmatrix} \equiv & \equiv & \equiv \end{bmatrix})}{\det(\begin{bmatrix} \equiv & \equiv & \equiv \end{bmatrix})}$$

Menu-7-3

Use a template  
OR Menu-7-1-1