

SYSTEMS OF EQUATIONS REVIEW

Calculator
 $2x - 7y = 470$

$$10x + 18y = 720$$

Menu - 3 - 3 - 1 - 3

Substitution

$$3x - 2y = -26 \Rightarrow \frac{3x}{2} + \frac{26}{2} = \frac{2y}{2}$$

$$4x + 5y = 19$$

$$\frac{3x}{2} + 13 = y$$

$$4x + 5\left(\frac{3x}{2} + 13\right) = 19$$

$$2\left[4x + \frac{15}{2}x + 65 = 19\right]$$

$$8x + 15x + 130 = 38$$

$$\frac{23x}{23} = \frac{-92}{23}$$

$$x = -4$$

$$y = \frac{3}{2}(-4) + 13$$

$$y = -6 + 13$$

$$y = 7$$

$$(-4, 7)$$

Cramer's Rule

$$2x + y = -3$$

$$5x - 8y = 87$$

$$x = \frac{\begin{vmatrix} \overset{x}{-3} & \overset{y}{1} \\ 87 & -8 \end{vmatrix}}{\begin{vmatrix} 2 & 1 \\ 5 & -8 \end{vmatrix}} = \frac{24 - 87}{-16 - 5} = \frac{-63}{-21} = 3$$

$$y = \frac{\begin{vmatrix} 2 & -3 \\ 5 & 87 \end{vmatrix}}{\begin{vmatrix} 2 & 1 \\ 5 & -8 \end{vmatrix}} = \frac{174 - 15}{-21} = \frac{189}{-21} = -9$$

$$\boxed{(3, -9)}$$

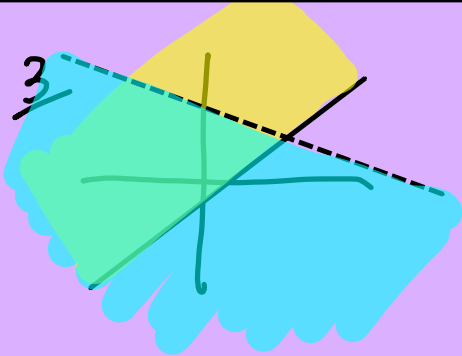
$$\begin{aligned}
 2x + y &= -3 \\
 5x - 8y &= 87
 \end{aligned}
 \quad [A]^{-1} \cdot \begin{bmatrix} 2 & 1 \\ 5 & -8 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 \\ 87 \end{bmatrix} \cdot [A]^{-1}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{-16 - 5} \begin{bmatrix} -8 & -1 \\ -5 & 2 \end{bmatrix} \cdot \begin{bmatrix} -3 \\ 87 \end{bmatrix}$$

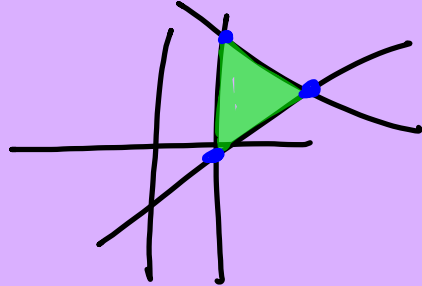
$$= \frac{1}{-21} \begin{bmatrix} 24 + -87 \\ 15 + 174 \end{bmatrix}$$

$$= \frac{1}{-21} \begin{bmatrix} -63 \\ 189 \end{bmatrix}$$

$$= \begin{bmatrix} 3 \\ -9 \end{bmatrix} \quad (3, -9)$$



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6) 3-Variable

$$\begin{aligned} 2x - y + 3z &= 9 \\ 3x - 4y + z &= -2 \\ x + 2y - 5z &= -10 \end{aligned}$$

$$y = \frac{\begin{vmatrix} 2 & 9 & 3 \\ 3 & -2 & 1 \\ 1 & -10 & -5 \end{vmatrix}}{\begin{vmatrix} 2 & -1 & 3 \\ 3 & -4 & 1 \\ 1 & 2 & -5 \end{vmatrix}} = \frac{2 \begin{vmatrix} -4 & 1 \\ 2 & -5 \end{vmatrix} - (-1) \begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix} + 3 \begin{vmatrix} 3 & -4 \\ 1 & 2 \end{vmatrix}}{2(20 - 2) - 18 + 36}$$

b) Solve for y by calculator

$$\frac{\det \begin{bmatrix} - & - & - \\ - & - & - \\ - & - & - \end{bmatrix}}{\det \begin{bmatrix} - & - & - \\ - & - & - \\ - & - & - \end{bmatrix}}$$

$$\begin{array}{l}
 2x - y + 3z = 9 \\
 3x - 4y + z = -2 \\
 -3 \left[\begin{array}{l} 2x - y + 3z = 9 \\ 3x - 4y + z = -2 \end{array} \right] \\
 x + 2y - 5z = -10
 \end{array}$$

Matrix Eq.
Calculator

$$\begin{bmatrix} 2 & -1 & 3 \\ 3 & -4 & 1 \\ 1 & 2 & -5 \end{bmatrix} \cdot \begin{bmatrix} 9 \\ -2 \\ 10 \end{bmatrix}$$