

Find the inverse of $\begin{bmatrix} 3 & 9 & 7 & 1 & 0 & 0 \\ 1 & 2 & 2 & 0 & 1 & 0 \\ -1 & -7 & -4 & 0 & 0 & 1 \end{bmatrix} R_1 \leftrightarrow R_2$

SCORE: ___ / 7 PTS

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 2 & 0 & 1 & 0 \\ 3 & 9 & 7 & 1 & 0 & 0 \\ -1 & -7 & -4 & 0 & 0 & 1 \end{array} \right] \begin{array}{l} R_2 + (-3)R_1 \\ R_3 + R_1 \end{array}$$

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 2 & 0 & 1 & 0 \\ 0 & 1 & 1/3 & 1/3 & -1 & 0 \\ 0 & 0 & -1/3 & 5/3 & -4 & 1 \end{array} \right] -3R_3$$

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 2 & 0 & 1 & 0 \\ 0 & 3 & 1 & 1 & -3 & 0 \\ 0 & -5 & -2 & 0 & 1 & 1 \end{array} \right] \frac{1}{3}R_2$$

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 2 & 0 & 1 & 0 \\ 0 & 1 & 1/3 & 1/3 & -1 & 0 \\ 0 & 0 & 1 & -5 & 12 & -3 \end{array} \right] \begin{array}{l} R_1 + (-2)R_3 \\ R_2 + (-\frac{1}{3})R_3 \end{array}$$

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 2 & 0 & 1 & 0 \\ 0 & 1 & 1/3 & 1/3 & -1 & 0 \\ 0 & -5 & -2 & 0 & 1 & 1 \end{array} \right] R_2 + 5R_3$$

$$\left[\begin{array}{ccc|ccc} 1 & 2 & 0 & 10 & -23 & 6 \\ 0 & 1 & 0 & 2 & -5 & 1 \\ 0 & 0 & 1 & -5 & 12 & -3 \end{array} \right] R_1 + (-2)R_2$$

$$\downarrow$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 6 & -13 & 4 \\ 0 & 1 & 0 & 2 & -5 & 1 \\ 0 & 0 & 1 & -5 & 12 & -3 \end{array} \right]$$

Find and use an inverse matrix to solve the system

$$13x - 12y = 8$$

$$5x + 7y = -1$$

SCORE: ____ / 5 PTS

$$\begin{bmatrix} 13 & -12 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 8 \\ -1 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{91 - (-60)} \begin{bmatrix} 7 & 12 \\ -5 & 13 \end{bmatrix} \begin{bmatrix} 8 \\ -1 \end{bmatrix}$$

$$= \frac{1}{151} \begin{bmatrix} 56 - 12 \\ -40 - 13 \end{bmatrix}$$

$$= \begin{bmatrix} \frac{44}{151} \\ -\frac{53}{151} \end{bmatrix}$$

Find $\begin{vmatrix} 2 & 0 & 1 & -2 \\ -1 & 3 & -3 & 0 \\ -2 & 4 & 0 & 4 \\ 3 & 1 & -4 & 0 \end{vmatrix}$

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$$= -(-2) \begin{vmatrix} -1 & 3 & -3 \\ -2 & 4 & 0 \\ 3 & 1 & -4 \end{vmatrix} - 4 \begin{vmatrix} 2 & 0 & 1 \\ -1 & 3 & -3 \\ 3 & 1 & -4 \end{vmatrix} + 2 \begin{vmatrix} -1 & 3 \\ -2 & 4 \\ 3 & 1 \end{vmatrix} + 0$$

$$= 2(16 + 0 + 6 - (-36 + 0 + 24)) - 4(-24 + 0 - 1 - (9 - 6 + 0))$$

$$= 2(22 + 12) - 4(-25 - 3)$$

$$= 2(34) - 4(-28)$$

$$= 68 + 112$$

$$= 180$$

$$x^2 + y^2 \geq 5$$

Graph, and find the vertices of the solution set of $x - y > -1$. $x - 1 \text{ NT} = -1$ $y - 1 \text{ NT} = 1$

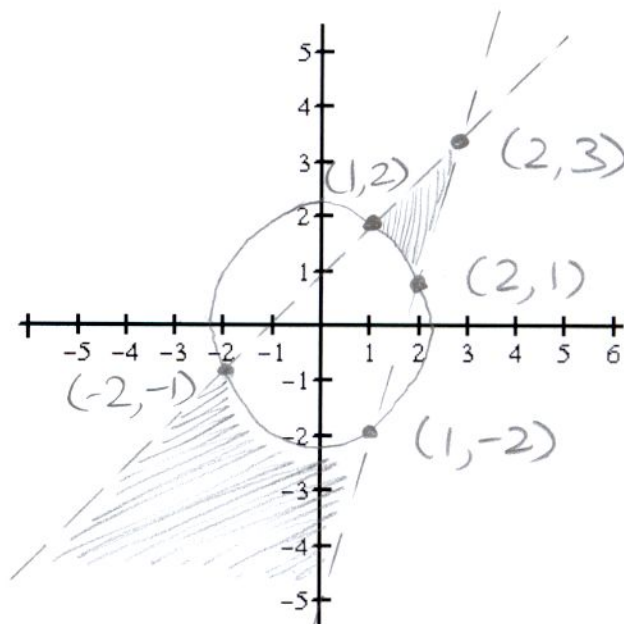
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$$3x - y < 5 \quad = \frac{5}{3} \quad -5$$

Show proper algebra work for full credit. **NO CREDIT FOR GUESS & CHECK.**

$$\begin{aligned} x - y &= -1 \\ 3x - y &= 5 \\ \hline -2x &= -4 \\ x &= 2 \\ y &= 3 \quad (2, 3) \end{aligned}$$

$$\begin{aligned} x - y &= -1 \rightarrow x = y - 1 \\ x^2 + y^2 &= 5 \\ (y - 1)^2 + y^2 &= 5 \\ 2y^2 - 2y + 1 &= 5 \\ 2y^2 - 2y - 4 &= 0 \\ y^2 - y - 2 &= 0 \\ (y - 2)(y + 1) &= 0 \\ y &= 2 \text{ or } y = -1 \\ x &= 1 \quad x = -2 \\ (1, 2) \quad (-2, -1) \end{aligned}$$



$$\begin{aligned} 3x - y &= 5 \rightarrow y = 3x - 5 \\ x^2 + y^2 &= 5 \\ x^2 + (3x - 5)^2 &= 5 \\ 10x^2 - 30x + 25 &= 5 \\ 10x^2 - 30x + 20 &= 0 \\ x^2 - 3x + 2 &= 0 \\ (x - 2)(x - 1) &= 0 \end{aligned}$$

$$(2, 1) \quad x = 2 \text{ or } x = 1 \quad y = 1 \quad y = -2 \quad (1, -2)$$