

THIS IS A NO GRAPHING CALCULATOR QUIZ

[2 POINTS] Let $A = \begin{bmatrix} 2 & 1 \\ -1 & 0 \\ 3 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -3 & -1 \\ 2 & 1 & 3 \end{bmatrix}$.

(a) Find AB .

$$\begin{bmatrix} 2 & -5 & 1 \\ 0 & 3 & 1 \\ -4 & -11 & -9 \end{bmatrix}$$

(b) Find BA .

$$\begin{bmatrix} 0 & 2 \\ 12 & -4 \end{bmatrix}$$

1 EACH

[3 POINTS]

Find the inverse of

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$$

$$\begin{array}{l} +(-2)R_1 \\ +(-3)R_1 \end{array} \begin{bmatrix} 1 & 0 & 0 & | & 1 & 0 & 0 \\ 2 & 1 & 0 & | & 0 & 1 & 0 \\ 3 & 2 & 1 & | & 0 & 0 & 1 \end{bmatrix} \quad \frac{1}{2}$$

$$+(-2)R_2 \begin{bmatrix} 1 & 0 & 0 & | & 1 & 0 & 0 \\ 0 & 1 & 0 & | & -2 & 1 & 0 \\ 0 & 2 & 1 & | & -3 & 0 & 1 \end{bmatrix} \quad 1$$

$$\begin{bmatrix} 1 & 0 & 0 & | & 1 & 0 & 0 \\ 0 & 1 & 0 & | & -2 & 1 & 0 \\ 0 & 0 & 1 & | & 1 & -2 & 1 \end{bmatrix} \quad 1$$

INVERSE

$$= \begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 1 & -2 & 1 \end{bmatrix} \quad \frac{1}{2}$$

[3 POINTS]

Solve the system of linear equations

$$2x - 7y = 4$$

$$-3x + 10y = -5$$

using an inverse matrix.

$$\begin{bmatrix} 2 & -7 \\ -3 & 10 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ -5 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 & -7 \\ -3 & 10 \end{bmatrix}^{-1} \begin{bmatrix} 4 \\ -5 \end{bmatrix}$$

$$= \frac{1}{20-21} \begin{bmatrix} 10 & 7 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} 4 \\ -5 \end{bmatrix} \quad \frac{1}{2}$$

$$= \begin{bmatrix} -10 & -7 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} 4 \\ -5 \end{bmatrix} \quad 1$$

$$= \begin{bmatrix} -5 \\ -2 \end{bmatrix} \quad \frac{1}{2}$$

$$\begin{array}{l} x = -5 \\ y = -2 \end{array} \quad \frac{1}{2}$$

[2 POINTS]

Determine if the matrix

$$\begin{bmatrix} 4 & -2 & 1 \\ -3 & 0 & 5 \\ -1 & 6 & 7 \end{bmatrix}$$

has an inverse using a determinant.

$$\begin{vmatrix} 4 & -2 & 1 \\ -3 & 0 & 5 \\ -1 & 6 & 7 \end{vmatrix} = \begin{vmatrix} 4 & -2 \\ -3 & 0 \end{vmatrix} - \begin{vmatrix} 4 & 1 \\ -1 & 7 \end{vmatrix} + \begin{vmatrix} -3 & 5 \\ -1 & 6 \end{vmatrix}$$

$$= 0 + 10 - 18 - 42 - 120 - 0 = -170 \neq 0$$

$\frac{1}{2}$ POINT

INVERSE EXISTS