Bell Ringer

Section A-4

Solve each matrix equation if possible.

1. $\begin{bmatrix} 12 & 7 \\ 5 & 3 \end{bmatrix} X = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$

2. $\begin{bmatrix} 0 & -4 \\ 0 & -1 \end{bmatrix} X = \begin{bmatrix} 0 \\ 4 \end{bmatrix}$

$\begin{bmatrix} 3 & -7 \\ -5 & 12 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} -15 & -17 \\ 26 & 29 \end{bmatrix}$

L A^{-1} R

det = 0

No inverse

Solve the system of equations using a matrix equation.

3. $\begin{cases} 2x + 3y = 5 \\ x + 2y = 6 \end{cases}$

det $2 \cdot 2 - 3 \cdot 1 = 1$

$A^{-1} = \frac{1}{1} \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$

$\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$

$\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 5 \\ 6 \end{bmatrix} = \begin{bmatrix} -8 \\ 7 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

Review.

4. Solve the system. $\begin{cases} \frac{1}{3}x + \frac{1}{2}y = 0 \\ \frac{1}{2}x + \frac{1}{5}y = \frac{11}{5} \end{cases}$

$2x + 3y = 0$ $(-8, 7)$

Section A-4 Solutions

Solve each matrix equation if possible.

1. $\begin{bmatrix} 12 & 7 \\ 5 & 3 \end{bmatrix} X = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$

$\begin{bmatrix} -15 & -17 \\ 26 & 29 \end{bmatrix}$

2. $\begin{bmatrix} 0 & -4 \\ 0 & -1 \end{bmatrix} X = \begin{bmatrix} 0 \\ 4 \end{bmatrix}$

Not Possible

Solve the system of equations using a matrix equation.

3. $\begin{cases} 2x + 3y = 5 \\ x + 2y = 6 \end{cases}$ $\begin{bmatrix} -8 \\ 7 \end{bmatrix}$

Review.

4. Solve the system. $\frac{1}{3}x + \frac{1}{2}y = 0$, $\frac{1}{2}x + \frac{1}{5}y = \frac{11}{5}$ $(6, -4)$

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Determine if an inverse exists, if it does, find the inverse

$$\begin{vmatrix} -4 & -1 \\ 4 & 1 \end{vmatrix} \quad -4+4=0$$

$$\frac{1}{\det}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

No inverse!

Determine if an inverse exists, if it does, find the inverse

$$\begin{vmatrix} -1 & -1 \\ 4 & 3 \end{vmatrix} \quad -3 + 4$$

$$= \frac{1}{1}\begin{bmatrix} 3 & 1 \\ -4 & -1 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ -4 & -1 \end{bmatrix}$$

Determine if an inverse exists, if it does, find the inverse

$$\begin{vmatrix} -4 & -3 & 1 \\ -1 & 0 & -1 \\ 1 & 5 & 2 \end{vmatrix} \quad A^{-1} \quad \frac{1}{-28} =$$

$$\det = 0 + 3 + {}^{-}5 - (0 + 20 + 6)$$

$$-2 - 26$$

$$= -28$$

Determine if an inverse exists, if it does, find the inverse

$$\begin{vmatrix} -1 & 5 & 2 \\ 0 & 0 & 1 \\ 4 & 2 & 3 \end{vmatrix}$$

Solving systems of equations using matrices

$x + y = 5$

$x - 2y = -4$

Solving systems of equations

$1x + 1y + 1z = 6$

$0x + 2y + 5z = -4$

$2x + 5y - 1z = 27$

$$A^{-1}\begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 5 \\ 2 & 5 & -1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = A^{-1}\begin{bmatrix} 6 \\ -4 \\ 27 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = A^{-1}\begin{bmatrix} 6 \\ -4 \\ 27 \end{bmatrix} \quad \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} \\ \\ \end{bmatrix}$$

Solving systems of equations

-b + 2c = 4

a + b - c = 10

2a + 3c = 1

$$A^{-1}\begin{bmatrix} 0 & -1 & 2 \\ 1 & 1 & -1 \\ 2 & 0 & 3 \end{bmatrix}\begin{bmatrix} a \\ b \\ c \end{bmatrix} = A^{-1} \cdot \begin{bmatrix} 4 \\ 10 \\ 1 \end{bmatrix}$$

An ultimate frisbee team has to order jerseys, shorts, and hats. They have a budget of $1350 to spend on $50 per jersey, $20 per shorts, and $15 per hat. They want to buy 40 items in preparation for the oncoming season and must order as many jerseys as shorts and hats combined.

Write and solve a system of equations to find out how many jerseys, shorts and hats they can buy

3x3 Matrices hw

A3 #s 20, 21, 54-57

A4 #s 9, 23, 27, 32, 37