

Write your questions and thoughts here!



You need a graphing calculator for this lesson!

RECALL:

$3x = 9$

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$AX = C$

Solving a Matrix EquationIf we know matrix A and matrix C , solve for the unknown matrix X .

$$AX = C$$

Find the inverse of a 2x2 matrix:

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

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

Find the inverse.

1. $\begin{bmatrix} 2 & -1 \\ 8 & -8 \end{bmatrix}$

2. $\begin{bmatrix} 0 & -2 \\ -3 & -12 \end{bmatrix}$

12.3 Inverse Matrices

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Solve the matrix equation.

$$3. \begin{bmatrix} 0 & -3 \\ 2 & 4 \end{bmatrix} X = \begin{bmatrix} -18 \\ 32 \end{bmatrix}$$



Solve the matrix equation using a graphing calculator.

$$4. \begin{bmatrix} 0 & -3 \\ 2 & 4 \end{bmatrix} X = \begin{bmatrix} -18 \\ 32 \end{bmatrix}$$

$$5. \begin{bmatrix} 7 & -3 \\ 9 & -1 \end{bmatrix} = \begin{bmatrix} -4 & -3 \\ 2 & -1 \end{bmatrix} Z$$

Linear systems of equations can be written as matrices:

$$AX = C$$



Solve each system using matrices (AND A CALCULATOR).

$$6. \begin{aligned} r - 5s - 4t &= 5 \\ r + 4s &= -3 \\ 3r + s + 4t &= -17 \end{aligned}$$

$$7. \begin{aligned} 4x - 2z &= 20 \\ z &= 7y - 9 \\ x &= 5y + 8z + 15 \end{aligned}$$

Now summarize what you learned!



12.3 Practice - Inverse Matrices

Find the inverse of each matrix. (SHOW WORK!)

1) $\begin{bmatrix} -5 & -3 \\ 5 & 2 \end{bmatrix}$

2) $\begin{bmatrix} -5 & -9 \\ 2 & 3 \end{bmatrix}$

3) $\begin{bmatrix} -1 & -1 \\ -2 & 1 \end{bmatrix}$

4) $\begin{bmatrix} 7 & -2 \\ 5 & -2 \end{bmatrix}$

Solve each equation. You can use a graphing calculator.

5) $\begin{bmatrix} -1 & -1 \\ -1 & 2 \end{bmatrix} Z = \begin{bmatrix} 3 & -4 \\ 9 & -13 \end{bmatrix}$

6) $\begin{bmatrix} -16 & 4 \\ 4 & -1 \end{bmatrix} = \begin{bmatrix} -4 & -4 \\ -1 & 0 \end{bmatrix} X$

7) $\begin{bmatrix} 4 & -2 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -16 & 36 \\ -8 & -37 \end{bmatrix}$

8) $\begin{bmatrix} -1 & -1 \\ -6 & -5 \end{bmatrix} B = \begin{bmatrix} 5 & 1 \\ 30 & 1 \end{bmatrix}$

Solve each system using matrices. Show the setup, then use a graphing calculator.

9)
$$\begin{aligned} -7y - 4z &= -10 \\ -5x + 8y + 2z &= -39 \\ 5x - y - 5z &= 7 \end{aligned}$$

10)
$$\begin{aligned} -8r + 8s + t &= -16 \\ r - 4s &= -20 \\ 8r + 3t &= 40 \end{aligned}$$

11)
$$\begin{aligned} 2x + 8z &= -10 \\ 5x - 7y &= 2 \\ x - y &= 0 \end{aligned}$$

12)
$$\begin{aligned} -6a + 2b + 4c &= 16 \\ a &= 3b - 10 \\ c &= 6b - 13 \end{aligned}$$

Answers to 12.3 Practice - Inverse Matrices

$$1) \begin{bmatrix} \frac{2}{5} & \frac{3}{5} \\ -1 & -1 \end{bmatrix}$$

$$2) \begin{bmatrix} 1 & 3 \\ -\frac{2}{3} & -\frac{5}{3} \end{bmatrix}$$

$$3) \begin{bmatrix} -\frac{1}{3} & -\frac{1}{3} \\ \frac{2}{3} & \frac{1}{3} \end{bmatrix}$$

$$4) \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{5}{4} & -\frac{7}{4} \end{bmatrix}$$

$$5) \begin{bmatrix} -5 & 7 \\ 2 & -3 \end{bmatrix}$$

$$6) \begin{bmatrix} -4 & 1 \\ 8 & -2 \end{bmatrix}$$

$$7) \begin{bmatrix} -8 & 7 \\ -8 & -4 \end{bmatrix}$$

$$8) \begin{bmatrix} -5 & 4 \\ 0 & -5 \end{bmatrix}$$

$$9) (7, -2, 6)$$

$$10) (8, 7, -8)$$

$$11) (-1, -1, -1)$$

$$12) (-7, 1, -7)$$

12.3 Application and Extension

For all problems, write the equations, and then write out your matrices. You may use a calculator to solve the system.

1. Mr. Brust is running low on manpris and has decided to pick up a part-time job sel On Thursday, Friday, and Saturday, he sold \$66 worth. On Thursday, he sold three times as much as on Friday. On Saturday, he sold \$6 more than on Friday. How much did he take in each day?



2. In triangle TUV, the measure of angle U is twice the measure of angle T. The measure of angle V is 80 more than that of angle T. Find the angle measures.

Algebra Skillz

Simplify.

1. $(-3)^2$

2. $(2x^5)^4$

3. $(x - 7)^2$

4. $(3x + 2)^2 + 1$