

ALG 2 Unit 10 Test Practice

#1) Info \rightarrow 2×3 matrix

Key ---

#2) Find the determinant of a 2×2 matrix

#3)
$$\begin{vmatrix} -3 & 4 \\ 2 & 5 \end{vmatrix} = -3(5) - 2(4) = -15 - 8 = -23$$
 $\begin{vmatrix} 5 & -5 \\ 1 & -1 \end{vmatrix} = 5(-1) - 1(-5) = -5 + 5 = 0$

$\det A = ad - bc$

$\circ \leftarrow$ matrix doesn't have an inverse

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

\leftarrow must use a GC:

\rightarrow Mat A (place into 3×3)

\rightarrow OPTN \rightarrow MAT \rightarrow DET

#5) Does the inverse exist? $\circ 53$

Are these matrices inverses of one another?

$A = \begin{bmatrix} 2 & 0 \\ -1 & 5 \end{bmatrix}$ $B = \begin{bmatrix} \frac{1}{2} & 0 \\ \frac{1}{10} & \frac{1}{5} \end{bmatrix}$ $A^{-1} = \frac{1}{\det A} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{2(5) - (-1)(0)} \begin{bmatrix} 5 & 0 \\ 1 & 2 \end{bmatrix}$

$= \frac{1}{10} \begin{bmatrix} 5 & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & 0 \\ \frac{1}{10} & \frac{1}{5} \end{bmatrix}$

yes ---

#6) Write a matrix equation for the given system of equations.

$$\begin{aligned} x - 2y + z &= 9 \\ 4x + 6z &= 0 \\ y - z &= 2 \end{aligned}$$

$$\begin{bmatrix} 1 & -2 & 1 \\ 4 & 0 & 6 \\ 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 9 \\ 0 \\ 2 \end{bmatrix}$$

#7) Write the dimensions of the given matrix

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

3×2

#8) Perform the indicated operation.

#9)
$$\begin{bmatrix} 0 & 3 \\ -1 & 5 \end{bmatrix} + \frac{1}{4} \begin{bmatrix} -4 & -16 \\ 12 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ -1 & 5 \end{bmatrix} + \begin{bmatrix} -1 & -4 \\ 3 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} -1 & -1 \\ 2 & 5 \end{bmatrix}$$

#10) Find the product,

$$\begin{bmatrix} 2 & 1 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} -3 & -2 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 2(-3)+1(4) & 2(-2)+1(5) \\ 3(-3)+0(4) & -3(-2)+0(5) \end{bmatrix} = \begin{bmatrix} -6+4 & -4+5 \\ 9+0 & 6+0 \end{bmatrix} = \begin{bmatrix} -2 & 1 \\ 9 & 6 \end{bmatrix}$$

#11) Find the inverse

$$A = \begin{bmatrix} 6 & -1 \\ -2 & 5 \end{bmatrix} \quad A^{-1} = \frac{1}{\det A} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{6(5) - (-2)(-1)} \begin{bmatrix} 5 & 1 \\ 2 & 6 \end{bmatrix}$$

$$= \frac{1}{28} \begin{bmatrix} 5 & 1 \\ 2 & 6 \end{bmatrix} = \begin{bmatrix} \frac{5}{28} & \frac{1}{28} \\ \frac{1}{14} & \frac{3}{14} \end{bmatrix}$$

By Hand:
A-1

Solve the matrix equation... must show work for multiplication

$AX = B$
 $X = A^{-1}B$

#14)

GC: A-1

$$\begin{bmatrix} 2 & 1 & 0 \\ -1 & 0 & 3 \\ 3 & -1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ -8 \\ -11 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} \frac{3}{17} & -\frac{2}{17} & \frac{3}{17} \\ \frac{11}{17} & \frac{4}{17} & \frac{16}{17} \\ \frac{1}{17} & \frac{5}{17} & \frac{1}{17} \end{bmatrix} \begin{bmatrix} 0 \\ -8 \\ -11 \end{bmatrix}$$

By hand...

$$\begin{bmatrix} 0 + \frac{16}{17} - \frac{33}{17} \\ 0 - \frac{32}{17} + \frac{66}{17} \\ 0 - \frac{40}{17} - \frac{11}{17} \end{bmatrix} = \begin{bmatrix} -\frac{17}{17} \\ \frac{34}{17} \\ -\frac{51}{17} \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix}$$