

Acc. Pre-Calculus
Ch. 10 Matrix Review

Name: _____

$$A = \begin{bmatrix} -5 & 2 \\ -8 & -7 \end{bmatrix}_{2 \times 2}$$

$$B = \begin{bmatrix} 3 & -4 \\ 7 & 9 \end{bmatrix}_{2 \times 2}$$

$$C = \begin{bmatrix} -2 & 1 & 0 \\ -1 & 0 & 3 \end{bmatrix}_{2 \times 3}$$

$$D = \begin{bmatrix} 0 & -4 & 0 \\ 2 & -1 & 1 \\ 3 & -2 & 5 \end{bmatrix}_{3 \times 3}$$

1. $B - A$

2. BC

3. AB

4. CA

$$\begin{bmatrix} 3 & -4 \\ 7 & 9 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ 8 & 7 \end{bmatrix}$$

$$\begin{array}{r} 3-4 \quad 3-4 \quad 3-4 \\ -2-1 \quad 1 \quad 0 \quad 0 \quad 3 \\ \hline -6+4=-2 \quad 3+0=3 \quad 0+(-12)=-12 \\ 7 \quad 9 \quad 7 \quad 9 \quad 7 \quad 9 \\ \hline -2-1 \quad 1 \quad 0 \quad 0 \quad 3 \\ \hline -14-9=-23 \quad 7+0=7 \quad 0+27 \end{array}$$

$$\begin{array}{r} -5 \quad 2 \\ 3 \quad 7 \\ \hline -5 \quad 2 \\ 3 \quad 7 \\ \hline -5 \quad 2 \\ 3 \quad 7 \\ \hline -15+14=-1 \quad 20+18=38 \\ -8-7 \quad -8-7 \\ 3 \quad 7 \quad -4 \quad 9 \\ \hline -8-7 \quad -8-7 \\ 3 \quad 7 \quad -4 \quad 9 \\ \hline -24-49=-73 \quad 32-63=-31 \end{array}$$

$$\begin{bmatrix} -1 & 38 \\ -73 & -31 \end{bmatrix}$$

$$2 \times 3 \cdot 2 \times 2$$

NP !!

$$\begin{bmatrix} 8 & -6 \\ 15 & 16 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 3 & -12 \\ 23 & 7 & 27 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 3 & -12 \\ 23 & 7 & 27 \end{bmatrix}$$

$$\begin{bmatrix} -8-7 & -8-7 \\ 3 \quad 7 & -4 \quad 9 \\ \hline -24-49=-73 & 32-63=-31 \end{bmatrix}$$

5. Find the determinant of A

$$\det = 35 - (-16) = \boxed{51}$$

6. Find the determinant of D.

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

$$\begin{array}{l} 0 + (-12) + 0 = -12 \\ 0 + 0 + (-40) = -40 \\ -12 - (-40) = \boxed{28} \end{array}$$

7. Find the inverse of B.

$$\det = 27 - (-28) = 55$$

$$\frac{1}{55} \begin{bmatrix} 9 & 4 \\ -7 & 3 \end{bmatrix} = \begin{bmatrix} 9/55 & 4/55 \\ -7/55 & 3/55 \end{bmatrix}$$

8. Find the inverse of D (Calc)

$$\begin{bmatrix} -3/28 & 5/7 & -1/7 \\ -1/4 & 0 & 0 \\ -1/28 & -3/7 & 2/7 \end{bmatrix}$$

9. Determine if the following work is correct or not. If not, correct it where they went wrong.

Find the inverse of $\begin{bmatrix} -5 & 5 \\ -2 & 2 \end{bmatrix}$

$$\det = -10 + +10$$

$$\det = 0$$

No inverse

$$\begin{bmatrix} -5 & 5 \\ -2 & 2 \end{bmatrix}^{-1} \rightarrow \det = -10 - 10 = -20$$

$$\frac{1}{20} \begin{bmatrix} 2 & -5 \\ 2 & -5 \end{bmatrix} = \begin{bmatrix} 1/10 & -1/4 \\ 1/10 & -1/4 \end{bmatrix}$$

10. Determine if the following work is correct or not. If not, correct it where they went wrong.

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

~~$$\begin{array}{r} -1 \quad 0 \\ 1 \quad -2 \\ \hline -1+0=-1 \\ -2 \quad 2 \\ 1 \quad -2 \\ \hline -2+(-4)=-6 \end{array} \quad \begin{array}{r} -1 \quad 0 \\ 0 \quad 2 \\ \hline 0+0=0 \\ -2 \quad 2 \\ 0 \quad 2 \\ \hline 0+4=4 \end{array} \quad \begin{array}{r} -1 \quad 0 \\ -1 \quad 3 \\ \hline -1+0=-1 \\ -2 \quad 2 \\ -1 \quad 3 \\ \hline -2+6=8 \end{array}$$~~

Can't multiply!

$$= \begin{bmatrix} -1 & 0 & 1 \\ -6 & 4 & 8 \end{bmatrix}$$

11. Solve $\frac{1}{2} \begin{bmatrix} 14 & 2x+2y \\ 2x-2y & -6 \end{bmatrix} = \begin{bmatrix} y+z & 10 \\ -2 & -3 \end{bmatrix}$

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

$$x+y=10$$

$$x-y=-2$$

$$2x=8$$

13. Determine if $\begin{bmatrix} 0 & 1 \\ 1 & 2 \\ 3 & 3 \end{bmatrix}$ and $\begin{bmatrix} 2 & -3 \\ 1 & 0 \end{bmatrix}$ are inverses. (show work!)

$$\det = 0 - (-3) = 3$$

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

Nope not =

Set up the matrix equation and solve using inverse matrices.

14. $2x - 5y = 15$

$3x - 6y = 36$

$$\det: -12 - (-18) = 3$$

$$\begin{bmatrix} 2 & -5 \\ 3 & -6 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 15 \\ 36 \end{bmatrix} \rightarrow \begin{bmatrix} -2 & 5/3 \\ -1 & 2/3 \end{bmatrix} \cdot \begin{bmatrix} 15 \\ 36 \end{bmatrix} = \begin{bmatrix} -2 & 5/3 \\ 15 & 36 \end{bmatrix} = \begin{bmatrix} -1 & 2/3 \\ 15 & 36 \end{bmatrix}$$

$$\frac{1}{3} \begin{bmatrix} -6 & 5 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} -2 & 5/3 \\ -1 & 2/3 \end{bmatrix}$$

Determine the area of each triangle whose vertices have the following coordinate.

15. (3,5), (6,-5), (-4,10)

$$\begin{bmatrix} 3 & 5 & 1 \\ 6 & -5 & 1 \\ -4 & 10 & 1 \end{bmatrix}$$

$$\frac{1}{2} \cdot 55 = 27.5 u^2$$

$$\begin{aligned} -15 - 20 + 60 &= 25 \\ 20 + 30 + 30 &= 80 \\ &= -55 \end{aligned}$$

16. (-8,10), (6,17), (2,-4)

$$\begin{bmatrix} -8 & 10 & 1 \\ 6 & 17 & 1 \\ 2 & -4 & 1 \end{bmatrix}$$

$$\frac{1}{2} \cdot 266 = 133 u^2$$

$$\begin{aligned} -136 + 20 - 24 &= -140 \\ 34 + 32 + 60 &= 126 \\ &> -266 \end{aligned}$$

Using a calculator solve the following systems.

$x - 2y + 3z = 1$

17. $x + 2y - z = 13$

$3x + 2y - 5z = 3$

$$(3, 7, 4)$$

$$\begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & -1 \\ 3 & 2 & -5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 13 \\ 3 \end{bmatrix}$$

$x + y - 2z = 3$

18. $x + 2y + z = 5$

$3x - y + 5z = 1$

$$(1, 2, 0)$$

$$\begin{bmatrix} 1 & 1 & -2 \\ 1 & 2 & 1 \\ 3 & -1 & 5 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix}$$