

Matrix Unit 4+ Test Review

Name _____ Per _____

Use the four matrices below for the following problems #1-8.

$$A = \begin{bmatrix} 5 & 3 \\ 2 & -10 \end{bmatrix}$$

$$B = \begin{bmatrix} 9 & -1 & 2 \\ -3 & 4 & 1 \end{bmatrix}$$

$$C = \begin{bmatrix} 3 & 1 & 3 \\ 1 & 0 & 1 \\ 3 & 1 & 3 \end{bmatrix}$$

$$D = \begin{bmatrix} 2 & 3 & -4 \\ 0 & 4 & -7 \end{bmatrix}$$

1. AB

2. A^2

3. The inverse of A

4. $B + D$

5. DA

6. AD

7. $D - 3B$

8. The determinant of A

Simplify. Write "undefined" for expressions that are undefined.

$$9) \begin{bmatrix} 2 \\ -1 \\ 2 \\ 0 \end{bmatrix} + \begin{bmatrix} -2 \\ 2 \\ -2 \\ 1 \end{bmatrix}$$

$$10) \begin{bmatrix} 6 & -1 \\ 2 & -2 \\ 1 & 0 \end{bmatrix} - \begin{bmatrix} 5 & -2 \\ -5 & 0 \\ 6 & 1 \end{bmatrix}$$

$$11) 3 \begin{bmatrix} 3 & 5 \\ -6 & 6 \\ 0 & 1 \end{bmatrix}$$

$$12) -4 \begin{bmatrix} 6 & -2 \\ -3 & 5 \end{bmatrix}$$

$$13) \begin{bmatrix} -6 \\ -3 \\ 2 \end{bmatrix} + \begin{bmatrix} -3 \\ 4 \\ -6 \end{bmatrix} + \begin{bmatrix} 5 \\ -3 \\ -6 \end{bmatrix}$$

$$14) 2[-5 \quad -2 \quad -4] - [-5 \quad -5 \quad -4]$$

$$15) \begin{bmatrix} -6 & 0 \\ -5 & -6 \end{bmatrix} \cdot \begin{bmatrix} -1 & -6 \\ -5 & 2 \end{bmatrix}$$

$$16) \begin{bmatrix} -4 & 3 \\ -4 & 5 \end{bmatrix} \cdot \begin{bmatrix} 0 & 4 & -5 \\ 1 & 1 & 3 \end{bmatrix}$$

Evaluate each determinant.

$$17) \begin{vmatrix} 3 & 1 \\ 3 & -5 \end{vmatrix}$$

$$18) \begin{vmatrix} -5 & 5 \\ -5 & 2 \end{vmatrix}$$

Find the inverse of each matrix.

$$19) \begin{bmatrix} -10 & 6 \\ 10 & -6 \end{bmatrix}$$

$$20) \begin{bmatrix} -10 & 9 \\ 6 & -6 \end{bmatrix}$$

Use the table below to answer the following questions #21-24. It shows the number of hair scrunchies the moms on the soccer team can make for their girls in 15 minutes.

Scrunchie type	Mom #1	Mom #2	Mom #3	Mom #4
Plain green	2	3	2	4
Fancy glittery/gold	1	2	2	1

21. Create a matrix A for this data.

22. What does $3A$ represent?

23. Which cell gives the number of green scrunchies made by Mom #3 in 15 minutes?

24. What does the cell $a_{2,4}$ represent in the matrix?

For #25-26, use $A = \begin{pmatrix} 6 & 5 \\ -1 & 4 \end{pmatrix}$. -----Now use a **calculator** on the rest!!!-----

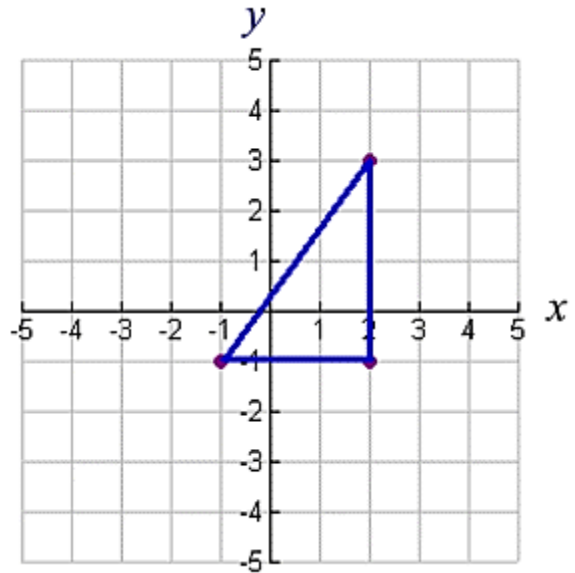
25. If $A \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -10 \\ -8 \end{bmatrix}$, what are the original two equations?

26. If $A \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -10 \\ -8 \end{bmatrix}$, what are the values of x and y?

Use the information for #27-28. Matrix A is a 180 degrees rotational matrix and Matrix B gives the coordinates of the shape shown.

$$A = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} -1 & 2 & 2 \\ -1 & 3 & -1 \end{bmatrix}$$

27. Calculate AB



28. Graph the coordinates given by AB on the grid.

The Disney friends are hosting various dinner parties around the holidays. There are 3 catering services that they are looking into (Stonefire, Rattlers, and Woodranch). Below are the requirements for the parties.

Party/Food	Tri-Tip	Chicken	Breadsticks	Pasta
Minnie's Christmas fun night	3	7	2	1
Daisy's Hanukkah celebration	6	0	8	3
Goofy's New Year bash	2	5	3	2

Food/Cost per person	Stonefire	Rattlers	Woodranch
Tri-Tip	\$5.55	\$6.75	\$7
Chicken	\$5	\$4.95	\$5.25
Breadsticks	\$0.90	\$1	\$0.50
Pasta	\$5.25	\$4.60	\$4

29. Use matrices to determine the cost of each party using each catering service.

30. Which catering service should Goofy use? Explain your answer.

Given $A = \begin{bmatrix} 2 & -2 \\ -4 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} -9 & 4 \\ -10 & 5 \end{bmatrix}$ find each of the following.

31. If $A \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -10 \\ 20 \end{bmatrix}$, then write the original equations.

32. If $A \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -10 \\ 20 \end{bmatrix}$, then solve the equations.

33. If $B \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 10 \end{bmatrix}$, what are the original equations?

34. If $B \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 10 \end{bmatrix}$, then what is the value of x and y ?

Answer Key

1. $\begin{bmatrix} 36 & 7 & 13 \\ 48 & -42 & -6 \end{bmatrix}$	2. $\begin{bmatrix} 31 & -15 \\ -10 & 106 \end{bmatrix}$	3. $\begin{bmatrix} \frac{5}{28} & \frac{3}{56} \\ \frac{1}{28} & -\frac{5}{56} \end{bmatrix}$	4. $\begin{bmatrix} 11 & 2 & -2 \\ -3 & 8 & -6 \end{bmatrix}$
5. Undefined	6. $\begin{bmatrix} 10 & 27 & -41 \\ 4 & -34 & 62 \end{bmatrix}$	7. $\begin{bmatrix} -25 & 6 & -10 \\ 9 & -8 & -10 \end{bmatrix}$	8. -56

9) $\begin{bmatrix} 0 \\ 1 \\ 0 \\ 1 \end{bmatrix}$

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

11) $\begin{bmatrix} 9 & 15 \\ -18 & 18 \\ 0 & 3 \end{bmatrix}$

12) $\begin{bmatrix} -24 & 8 \\ 12 & -20 \end{bmatrix}$

13) $\begin{bmatrix} -4 \\ -2 \\ -10 \end{bmatrix}$

14) $\begin{bmatrix} -5 & 1 & -4 \end{bmatrix}$

15) $\begin{bmatrix} 6 & 36 \\ 35 & 18 \end{bmatrix}$

16) $\begin{bmatrix} 3 & -13 & 29 \\ 5 & -11 & 35 \end{bmatrix}$

17) -18

18) 15

19) No inverse exists

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

21. $\begin{bmatrix} 2 & 3 & 2 & 4 \\ 1 & 2 & 2 & 1 \end{bmatrix}$	22. It represents the number of scrunchies each mom could make in 45 minutes.	23. $a_{1,3}$	24. Mom #4 can make 1 fancy glittery/gold scrunchie in 15 minutes.
25. $6x + 5y = -10$ $-x + 4y = -8$	26. $x = 0, y = -2$	27. $\begin{bmatrix} 1 & -2 & -2 \\ 1 & -3 & 1 \end{bmatrix}$	28. Graph
29. $\begin{bmatrix} \$58.70 & \$61.50 & \$62.75 \\ \$56.25 & \$62.30 & \$58 \\ \$49.30 & \$50.45 & \$49.75 \end{bmatrix}$	30. Goofy should use Stonefire, since it will be the cheapest price for him (\$49.30 is cheaper than \$49.75 or \$50.45).	31. $2x - 2y = -10$ $-4x + 6y = 20$	32. $x = -5, y = 0$
33. $-9x + 4y = 10$ $-10x + 5y = 10$	34. $x = -2, y = -2$		