

Basic Matrix Operations Worksheet

Name _____

Determine the dimensions of the matrix.

1. $\begin{bmatrix} 7 & 0 & -1 & 12 \\ 4 & 6 & -3 & -5 \end{bmatrix}$

2. $\begin{bmatrix} 8 & 6 \\ -8 & -5 \\ 0 & 23 \end{bmatrix}$

3. $\begin{bmatrix} 55 \\ -9 \end{bmatrix}$

Perform the indicated operation.

4. $\begin{bmatrix} 7 & 10 & 6 \\ 0 & -5 & 1 \end{bmatrix} + \begin{bmatrix} -7 & -4 & 7 \\ -3 & 12 & 2 \end{bmatrix}$

5. $\begin{bmatrix} 2 & 11 \\ 7 & 15 \end{bmatrix} - \begin{bmatrix} -4 & 0 \\ -8 & 12 \end{bmatrix}$

6. $\frac{1}{3} \begin{bmatrix} 9 & -3 \\ -27 & 0 \\ 12 & 5 \end{bmatrix}$

7. $-\frac{1}{2} \begin{bmatrix} 8 & 1 \\ 0 & -6 \end{bmatrix} + 2 \begin{bmatrix} 0 & -5 \\ -1 & 7 \end{bmatrix}$

8. $-3 \left(\begin{bmatrix} 3 & -1 \\ 4 & 5 \end{bmatrix} - 5 \begin{bmatrix} 5 & -3 \\ 0 & 7 \end{bmatrix} \right) + 6 \begin{bmatrix} 4 & 2 \\ 1 & 0 \end{bmatrix}$

9. $-\frac{2}{5} \begin{bmatrix} 15 & 25 \\ 35 & -85 \\ 10 & 25 \end{bmatrix} + 3 \begin{bmatrix} 1 & -7 \\ -5 & 6 \\ 0 & 4 \end{bmatrix} + 5 \begin{bmatrix} -10 & -2 \\ -7 & -8 \\ -1 & 0 \end{bmatrix}$

Solve the matrix for the variables.

$$10. \quad \begin{bmatrix} \frac{3}{4}x & -2y \\ 15 & 44 \end{bmatrix} = \begin{bmatrix} 27 & -22 \\ -\frac{1}{3}w & -4z \end{bmatrix}$$

$$11. \quad -3 \left(\begin{bmatrix} 4 & -7x \\ 2y & 1 \end{bmatrix} - \begin{bmatrix} 14 & 5 \\ -3 & 2 \end{bmatrix} \right) = \begin{bmatrix} 30 & 18 \\ 27 & 3 \end{bmatrix}$$

Find the product.

$$12. \quad \begin{bmatrix} -9 & 0 \\ -2 & 3 \end{bmatrix} \cdot \begin{bmatrix} -2 & 6 \\ 4 & -8 \end{bmatrix}$$

$$13. \quad \begin{bmatrix} 3 & -2 & 4 \\ 0 & 7 & -8 \end{bmatrix} \cdot \begin{bmatrix} 9 & -1 \\ 2 & -3 \\ -4 & 1 \end{bmatrix}$$

Using the given matrices, evaluate the expression.

$$A = \begin{bmatrix} 4 & 7 \\ -1 & -3 \end{bmatrix}, B = \begin{bmatrix} 0 & 3 \\ 5 & -2 \end{bmatrix}, C = \begin{bmatrix} 8 & -1 \\ 1 & -2 \\ 3 & -2 \end{bmatrix}, D = \begin{bmatrix} 1 & 3 & -2 \\ 4 & 0 & -6 \\ -3 & 1 & 2 \end{bmatrix}, E = \begin{bmatrix} 9 & 1 & 0 \\ 2 & 6 & -3 \\ -1 & -4 & 2 \end{bmatrix}$$

$$14. \quad 5BA$$

$$15. \quad \frac{1}{2}C + DC$$

$$16. \quad -3(CA - CB)$$

$$17. \quad \det E$$

$$18. \quad CBB$$

$$19. \quad D^{-1}$$

Find the determinant of the following matrices.

20. $\begin{vmatrix} 3 & 6 \\ -8 & -3 \end{vmatrix}$

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

22. Solve for x. $\begin{vmatrix} x & 1 & 3 \\ 2 & -5 & x \\ 1 & -1 & 2 \end{vmatrix} = -15$

23. Find the area of the triangle with vertices $A(2,1), B(5,4), C(-1,8)$.

Solve the system of equations using inverse matrices on your calculator.

24. $-x + y = 4$
 $2x - 4y = -34$

25. $2x + y + 3z = 1$
 $2x + 6y + 8z = 3$
 $6x + 8y + 18z = 5$