

1-11 Operations with Matrices: Addition and Subtraction

Name _____

Date _____

Consider the matrices: $A = \begin{bmatrix} -1 & 2.5 & 4 \\ 3 & -5 & 2.8 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & -3.8 & 9 \\ -2 & -4 & 1.9 \end{bmatrix}$

Find $A + B$.

$$\begin{aligned} A + B &= \begin{bmatrix} -1 & 2.5 & 4 \\ 3 & -5 & 2.8 \end{bmatrix} + \begin{bmatrix} 6 & -3.8 & 9 \\ -2 & -4 & 1.9 \end{bmatrix} \quad \leftarrow \text{Each matrix is } 2 \times 3, \text{ so you can add the matrices.} \\ &= \begin{bmatrix} -1 + 6 & 2.5 + (-3.8) & 4 + 9 \\ 3 + (-2) & -5 + (-4) & 2.8 + 1.9 \end{bmatrix} \quad \leftarrow \text{Add corresponding elements.} \\ &= \begin{bmatrix} 5 & -1.3 & 13 \\ 1 & -9 & 4.7 \end{bmatrix} \quad \leftarrow \text{Simplify.} \end{aligned}$$

Find $A - B$.

$$\begin{aligned} A - B &= \begin{bmatrix} -1 & 2.5 & 4 \\ 3 & -5 & 2.8 \end{bmatrix} - \begin{bmatrix} 6 & -3.8 & 9 \\ -2 & -4 & 1.9 \end{bmatrix} \quad \leftarrow \text{Each matrix is } 2 \times 3, \text{ so you can subtract the matrices.} \\ &= \begin{bmatrix} -1 - 6 & 2.5 - (-3.8) & 4 - 9 \\ 3 - (-2) & -5 - (-4) & 2.8 - 1.9 \end{bmatrix} \quad \leftarrow \text{Subtract corresponding elements.} \\ &= \begin{bmatrix} -7 & 6.3 & -5 \\ 5 & -1 & 0.9 \end{bmatrix} \quad \leftarrow \text{Simplify.} \end{aligned}$$

Write the dimensions of each matrix.

1. $\begin{bmatrix} 1 & -2 & 3 & 5 \\ -9 & 11 & -4 & 7 \end{bmatrix}$

2 rows, 4 columns
 2×4

2. $\begin{bmatrix} 5 & 3 \\ 6 & 8 \\ 7 & 2 \end{bmatrix}$

3. $\begin{bmatrix} 1 & 8 \end{bmatrix}$

4. $\begin{bmatrix} 1 & 5 \\ 5 & 1 \end{bmatrix}$

5. $\begin{bmatrix} 2 & 3 & 5 \\ 1 & 0 & 7 \\ 4 & 0 & 0 \end{bmatrix}$

6. $\begin{bmatrix} 1 & 2 & 11 & 1 \\ 4 & 6 & 2 & 8 \\ 1 & 2 & 12 & 5 \end{bmatrix}$

7. $\begin{bmatrix} 5 & 0 & 3 & 2 & 9 \end{bmatrix}$

8. $\begin{bmatrix} 8 & 0 & 1 & 2 & 9 \\ 1 & 4 & 3 & 7 & 5 \end{bmatrix}$

9. $\begin{bmatrix} 3 \\ 8 \\ -9 \end{bmatrix}$

10. $\begin{bmatrix} -4 & 0 & -3 & 3 \end{bmatrix}$

11. $\begin{bmatrix} 6 & 15 & 11 \\ 13 & -8 & 4 \end{bmatrix}$

12. $\begin{bmatrix} 7 & -3 & 6 & 2 & 8 \\ 9 & 4 & -2 & 1 & 0 \\ 10 & -5 & -1 & 11 & 13 \end{bmatrix}$



Add or subtract, as indicated.

$$13. \begin{bmatrix} 1 & -1 \\ 8 & 10 \end{bmatrix} + \begin{bmatrix} 6 & -9 \\ 5 & 7 \end{bmatrix}$$

$$\begin{bmatrix} 1+6 & -1+(-9) \\ 8+5 & 10+7 \end{bmatrix} = \begin{bmatrix} 7 & -10 \\ 13 & 17 \end{bmatrix}$$

$$14. \begin{bmatrix} 3 & -2 \\ -7 & 6 \end{bmatrix} + \begin{bmatrix} 7 & -4 \\ 2 & 1 \end{bmatrix}$$

$$15. \begin{bmatrix} 8 & -2.3 & 6 \\ 6 & 5.9 & -5 \end{bmatrix} - \begin{bmatrix} -2 & 3 & 5.7 \\ 7 & 6.7 & -2 \end{bmatrix} + \begin{bmatrix} -4 & 8 & 5 \\ -2 & 1.5 & -4 \end{bmatrix}$$

$$16. \begin{bmatrix} 1 & 3.5 & -2.9 \\ 2 & 5 & 7 \end{bmatrix} - \begin{bmatrix} -7 & 1.1 & -8 \\ 3 & -6 & 7.5 \end{bmatrix} + \begin{bmatrix} 3 & 2 & 1 \\ -8 & 6 & 4 \end{bmatrix}$$

Find matrix X that results in a true statement.

$$17. \begin{bmatrix} 5 & -2 \\ 1 & 13 \end{bmatrix} + X = \begin{bmatrix} 11 & -2 \\ 19 & -5 \end{bmatrix}$$

$$X = \begin{bmatrix} 11 & -2 \\ 19 & -5 \end{bmatrix} - \begin{bmatrix} 5 & -2 \\ 1 & 13 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 18 & -18 \end{bmatrix}$$

$$18. \begin{bmatrix} -8 & 6 \\ -2 & 31 \end{bmatrix} + X = \begin{bmatrix} 2 & -5 \\ 16 & -12 \end{bmatrix}$$

$$19. X - \begin{bmatrix} 3 & -2 & 1.6 \\ 3.4 & 9 & 15 \end{bmatrix} = \begin{bmatrix} -1 & 12 & 9.2 \\ 4.6 & -4 & 13 \end{bmatrix}$$

$$20. X - \begin{bmatrix} -8 & 19 & 5.7 \\ 8.2 & -3 & 24 \end{bmatrix} = \begin{bmatrix} -2 & 10 & 6.1 \\ 2.2 & -10 & 21 \end{bmatrix}$$

Solve. Show your work.

21. At the beginning of May, a store had 80 red, 120 blue, and 90 black cell phones. During the month, the store sold 35 red, 74 blue, and 71 black cell phones. Write a matrix to indicate the inventory at the end of May.

22. In June, Vicki collected 28.2 pounds of cans, 78.7 pounds of bottles, and 110.1 pounds of newspapers. In July, she collected 59.4 pounds of cans, 113.6 pounds of bottles, and 168.9 pounds of newspapers. Write a matrix to indicate the total number of pounds of each she collected in June and July.

TEST PREPARATION

23. What are the dimensions of the matrix $\begin{bmatrix} -1 & 12 \end{bmatrix}$?

A. 1×2

B. 2×1

C. 12×-1

D. -1×12