

Practice 4-3

Matrix Multiplication

Use matrices A , B , C , D , and E to find each product, sum, or difference, if possible. If not possible, write *product undefined*, *sum undefined*, or *difference undefined*.

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

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

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

$$D = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$E = \begin{bmatrix} 3 \\ -3 \\ 2 \end{bmatrix}$$

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|------------|--------------------|-------------|-------------|-------------|
| 1. $3AB$ | 2. $2A + 4D$ | 3. $5D - A$ | 4. $2C - E$ | 5. $3D + A$ |
| 6. DA | 7. AE | 8. BD | 9. DB | 10. CE |
| 11. DC | 12. EB | 13. CB | 14. $2D$ | 15. BE |
| 16. $0.2B$ | 17. $\frac{1}{4}C$ | 18. $0.5AC$ | 19. DE | 20. $-3DE$ |

Find the dimensions of the product matrix. Then find each product.

21. $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [1 \ 2 \ 3 \ 4]$

22. $\begin{bmatrix} 1 & 2 & 12 \\ 12 & 2 & 1 \end{bmatrix} \begin{bmatrix} 3 & 4 \\ 4 & 3 \\ 5 & 2 \end{bmatrix}$

23. $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$

Find each product if possible. If not possible, write *product undefined*.

24. $-12 \begin{bmatrix} -6 & -2 \\ -5 & -6 \\ 0 & 1 \end{bmatrix}$

25. $\begin{bmatrix} 3 & 2 \\ 4 & 6 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} -3 & 3 & -2 \\ -2 & 5 & -1 \end{bmatrix}$

26. $\begin{bmatrix} 0 & 1 & 0 \\ 2 & 2 & 1 \end{bmatrix} \begin{bmatrix} -2 & 2 & 2 \\ -1 & 1 & 1 \\ 0 & -1 & -1 \end{bmatrix}$

27. $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 4 & 1 \\ 5 & 6 \end{bmatrix}$

28. $\begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 6 & 4 & 2 & 8 \\ 10 & 4 & 6 & 2 \\ 2 & 10 & 12 & 4 \end{bmatrix}$

29. $\begin{bmatrix} 4 & 3 \\ 9 & 7 \end{bmatrix} \begin{bmatrix} 6 & 3 \\ 9 & 4 \end{bmatrix}$

Solve each equation. Check your answers.

30. $2 \begin{bmatrix} 0 & 1 \\ 3 & -4 \end{bmatrix} - 3X = \begin{bmatrix} 9 & -6 \\ 1 & -2 \end{bmatrix}$

31. $\frac{1}{2}X + \begin{bmatrix} 5 & -1 \\ 0 & \frac{2}{3} \end{bmatrix} = 2 \begin{bmatrix} 3 & 0 \\ 1 & 2 \end{bmatrix}$