

Sec 1H Unit 7 Day 4 – Multiplying Matrices Assignment



Determine whether each matrix product is defined. If so, state the dimensions of the product.

1. $A_{7 \times 4} \cdot B_{4 \times 3}$

2. $A_{3 \times 5} \cdot B_{5 \times 8}$

3. $M_{2 \times 1} \cdot C_{1 \times 6}$

4. $M_{3 \times 2} \cdot N_{3 \times 2}$

5. $P_{1 \times 9} \cdot Q_{9 \times 1}$

6. $P_{8 \times 1} \cdot Q_{1 \times 8}$

Find the product, if possible.

7. $\begin{bmatrix} 2 & -1 \end{bmatrix} \cdot \begin{bmatrix} 5 \\ 4 \end{bmatrix}$

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

9. $\begin{bmatrix} 4 & -1 & 6 \\ 1 & 5 & -8 \end{bmatrix} \cdot \begin{bmatrix} 1 & 3 \\ 9 & -6 \end{bmatrix}$

10. $\begin{bmatrix} 4 & -2 & -7 \\ 6 & 3 & 5 \end{bmatrix} \cdot \begin{bmatrix} -2 \\ 5 \\ 3 \end{bmatrix}$

11. $\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 3 & -9 & -2 \\ 5 & 7 & -6 \end{bmatrix}$

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

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

14. $\begin{bmatrix} 0 & 8 \\ 3 & 1 \\ -1 & 5 \end{bmatrix} \cdot \begin{bmatrix} 3 & 1 & -2 \\ 0 & 8 & -5 \end{bmatrix}$

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

16. $\begin{bmatrix} 2 & 4 & 8 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 0 \\ -6 \end{bmatrix}$

17. $\begin{bmatrix} 1 \\ 0 \\ -6 \end{bmatrix} \cdot \begin{bmatrix} 2 & 4 & 8 \end{bmatrix}$

$$C = \begin{bmatrix} 4 & 0 \\ -3 & 7 \\ -5 & 9 \end{bmatrix} \text{ and } D = \begin{bmatrix} 3 & 1 & -2 \\ 0 & 8 & -5 \end{bmatrix}, \text{ then } M = CD.$$

Find the following elements of matrix M **without** multiplying all of $C \cdot D$:

18. $M_{1,1}$

19. $M_{2,3}$

20. $M_{3,1}$

For #21 – 32, use $A = \begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ -2 & -1 \end{bmatrix}$, $C = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$, and scalar $d = 3$

to determine whether the following equations are true or false. **Explain how you know.**

21. $AC = CA$

22. $AB = BA$

23. $(AB)d = d(AB)$

24. $(AB)C = A(BC)$

25. $(A + C)B = B(A + C)$

26. $A(B + C) = BA + CA$

27. $(A + C)B = (C + A)B$

28. $A(B + C) = AB + AC$

29. Is matrix multiplication commutative?

Explain how you know:

30. Is multiplication by a scalar commutative?

Explain how you know:

31. Is matrix multiplication associative?

Explain how you know:

32. Can you distribute matrices?

Explain how you know: