Precalculus

7.2 Practice Worksheet

Determine whether each product is defined. If it is defined, calculate the product.

1.) $\begin{bmatrix} 5 & -8 \\ 7 & 1 \end{bmatrix}\begin{bmatrix} 4 & 7 \\ -3 & 9 \end{bmatrix} = \begin{bmatrix} 44 & -37 \\ 24 & 58 \end{bmatrix}$

$2\times2 \quad 2\times2$ Yes $\qquad 2\times2$

$a_{11} = 5(4)+(-8)(-3) = 44 \qquad a_{12} = 5(7)+(-8)(9) = -37$

$a_{21} = 7(4)+1(-3) = 24 \qquad a_{22} = 7(7)+1(9) = 58$

2.) $\begin{bmatrix} -2 & 3 & 5 \end{bmatrix}\begin{bmatrix} 1 & 4 \\ 7 & -3 \\ -1 & -5 \end{bmatrix} = \begin{bmatrix} 14 & -42 \end{bmatrix}$

$1\times3 \cdot 3\times2$ Yes $\qquad 1\times2$

$a_{11} = -2(1)+3(7)+5(-1) = 14 \qquad a_{12} = (-2)(4)+3(-3)+5(-5) = -42$

3.) $\begin{bmatrix} 6 & -9 \\ 0 & 5 \end{bmatrix}\begin{bmatrix} 5 & -3 \\ 9 & 6 \\ 2 & 1 \end{bmatrix} =$ No Product

$2\times2 \cdot 3\times2$

4.) $\begin{bmatrix} -1 & 3 & 1 \\ 2 & 4 & 3 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 2 & 4 & -3 \\ 5 & 1 & 2 \\ -1 & 3 & 4 \end{bmatrix} = \begin{bmatrix} 12 & 2 & 13 \\ 21 & 21 & 14 \\ 0 & 10 & 5 \end{bmatrix}$

$3\times3 \cdot 3\times3$ Yes $\qquad 3\times3$

$a_{11} = -1(2)+3(5)+1(-1) = 12 \qquad a_{12} = -1(4)+3(1)+1(3) = 2 \qquad a_{13} = -1(-3)+3(2)+1(4) = 13$

$a_{21} = 2(2)+4(5)+3(-1) = 21 \qquad a_{22} = 2(4)+4(1)+3(3) = 21 \qquad a_{23} = 2(-3)+4(2)+3(4) = 14$

$a_{31} = 1(2)+0(5)+2(-1) = 0 \qquad a_{31} = 1(4)+0(1)+2(3) = 10 \qquad a_{33} = 1(-3)+0(2)+2(4) = 5$

5.) $\begin{bmatrix} 10 & 20 \\ 30 & 40 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 10 & 20 \\ 30 & 40 \end{bmatrix}$ (Same matrix!)

$2\times 2 \cdot 2\times 2$

Yes

$a_{11} = 10(1) + 20(0) = 10$ $a_{12} = 10(0) + 20(1) = 20$

$a_{21} = 30(1) + 40(0) = 30$ $a_{22} = (30)(0) + 40(1) = 40$

6.) $\begin{bmatrix} 2 & 3 & 4 \\ 5 & 1 & 2 \\ 6 & 5 & 7 \end{bmatrix} \begin{bmatrix} -3 & -1 & 2 \\ -23 & -10 & 16 \\ 19 & 8 & -13 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ Called Identity Matrix!

$3\times 3 \cdot 3\times 3$

Yes

7.) $\begin{bmatrix} 2 & -1 & 8 \\ 0 & 3 & 1 \\ -4 & 4 & -7 \\ 0 & 1 & 1 \end{bmatrix} \cdot \begin{bmatrix} 5 & -2 \\ 6 & 10 \\ 9 & 0 \end{bmatrix} = \begin{bmatrix} 76 & -14 \\ 27 & 30 \\ -59 & 48 \\ 15 & 10 \end{bmatrix}$

$4\times 3 \cdot 3\times 2$ 4×2

Yes

$a_{11} = 2(5) + (-1)(6) + 8(9) =$

8.) $\begin{bmatrix} 6 & -3 & 7 & 2 \\ 5 & 2 & -1 & -2 \end{bmatrix} \cdot \begin{bmatrix} 4 & -1 & 6 \\ 5 & 4 & -3 \\ 9 & 0 & 1 \\ -8 & -6 & 2 \end{bmatrix} = \begin{bmatrix} 56 & -30 & 56 \\ 37 & 15 & 19 \end{bmatrix}$

2×4 4×3 2×3

Yes

$a_{11} = 6(4) + (-3)(5) + 7(9) + 2(-8) =$