Name: Key

6.0/6.2 Matrix Operations

State whether the product of AB is defined. If so, give the dimensions of AB.

1) A: 2X 2 B: 3 X 2 — not possible

2) A: 6X 1 B: 1 X 6 — 6 X 6

3) A: 2 X 4 B: 4 X 4 — 2 X 4

4) A: 3 X 5 B: 3 X 3 — not possible

Complete the next step of the matrix multiplication.(each step is written out)

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

2×2 2×3

6) $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}\begin{bmatrix} -4 & 6 \end{bmatrix} = \begin{bmatrix} 1(-4) & 1(6) \\ -8 & -12 \\ -12 & 18 \end{bmatrix}$

3×1 1×2

For 7& 8, find the product if possible.

7) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} -1 & 3 \\ 2 & 5 \end{bmatrix}$

2×2 2×2

$\begin{bmatrix} -1+0 & 3+0 \\ 0+2 & 0+5 \end{bmatrix}$

$\begin{bmatrix} -1 & 3 \\ 2 & 5 \end{bmatrix}$

8) $\begin{bmatrix} 2 & 0 & 1 \\ -3 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}\begin{bmatrix} -2 & -1 & 2 \\ 1 & 0 & 3 \\ 0 & -4 & 1 \end{bmatrix}$

3×3 3×3

$\begin{bmatrix} -4+0+0 & -2+0+4 & 4+0+1 \\ 6+1+0 & 3+0+8 & -6+3+2 \\ 0 & 16 & 4 \end{bmatrix}$

$\begin{bmatrix} -4 & 6 & 5 \\ 7 & -3 & -1 \\ 0 & 16 & 4 \end{bmatrix}$

9) Given $A = \begin{bmatrix} 3 \\ -1 \\ 0 \end{bmatrix}$ $B = \begin{bmatrix} 2 \\ 5 \\ 1 \end{bmatrix}$ $C = \begin{bmatrix} 4 & -4 & 2 \end{bmatrix}$

find (B - A)C

$\begin{bmatrix} -1 \\ 6 \\ 1 \end{bmatrix}$ $\begin{bmatrix} 4 & -4 & 2 \end{bmatrix}$

3×1 1×3

$\begin{bmatrix} -4 & 4 & -2 \\ 24 & -24 & 12 \\ 4 & -4 & 2 \end{bmatrix}$

7) Multiply

$\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}\bullet\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$

1×3 3×1

3+4+3

$\begin{bmatrix} 10 \end{bmatrix}$

8) Simplify

$\frac{1}{2}\left(\begin{bmatrix} 7 & 8 \\ -5 & 1 \end{bmatrix}+\begin{bmatrix} 5 & 12 \\ 0 & 8 \end{bmatrix}\right)$

$\frac{1}{2}\begin{bmatrix} 12 & 20 \\ -5 & 9 \end{bmatrix}$

$\begin{bmatrix} 6 & 10 \\ -5/2 & 9/2 \end{bmatrix}$

9) Solve:

$\begin{bmatrix} x & 8 \\ 0 & y \end{bmatrix}\bullet\begin{bmatrix} -2 & 3 \\ 1 & 4 \end{bmatrix}=\begin{bmatrix} -4 & 50 \\ 1 & 4 \end{bmatrix}$

$\begin{bmatrix} -2x+8 & 3x+32 \\ 0+4 & 0+4y \end{bmatrix}$ $\begin{bmatrix} -4 & 50 \\ 1 & 4 \end{bmatrix}$

$-2x+8=-4$

$x=6$ $y=1$

10) Condominium owners must pay yearly fees to cover the cost of maintenance, landscaping, and remodeling. The fees this year are \$96, \$18, and \$66 for a 1 – bedroom unit, and \$128, \$24, and \$88 for a 2 – bedroom unit. The fees next year are \$105, \$20, and \$73 for a 1 – bedroom unit, and \$141, \$26, and \$97 for a 2 – bedroom unit. Use matrices to organize the information. Then use the matrices to find the yearly changes in fees from this year to next year.

M L R

1B $\begin{bmatrix} 96 & 18 & 66 \\ 128 & 24 & 88 \end{bmatrix}$ 2B

YR1

$\begin{bmatrix} 105 & 20 & 73 \\ 141 & 26 & 97 \end{bmatrix}$

YR2

YR2 − YR1 = $\begin{bmatrix} 9 & 2 & 7 \\ 13 & 2 & 11 \end{bmatrix}$