

Math 12 A - Answer Key - Section 9.5 - Algebra of Matrices

Pr. 684-65 #2)

$$A = \begin{bmatrix} \frac{1}{4} & \frac{1}{m} & 1 \\ 2 & 3 & \end{bmatrix} \quad B = \begin{bmatrix} 1.25 & 0 \\ \sqrt{9} & \frac{6}{2} \end{bmatrix}$$

A and B are equal.

#4)

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

#6)

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

= undefined or D.N.E.
does not exist

Matrices are not the same size
So can't be added together

#8)

$$\begin{bmatrix} 2 & 1 & 2 \\ 6 & 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & -2 \\ 3 & 6 \\ -2 & 6 \end{bmatrix} =$$

$$\begin{bmatrix} 2+3+(-4) & -4+6+0 \\ 6+9-8 & -12+18+6 \end{bmatrix} =$$

$$\begin{bmatrix} 1 & 2 \\ 7 & 6 \end{bmatrix}$$

$$2 \times 3 \cdot 3 \times 2 = 2 \times 2$$

#9)

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

$$\begin{bmatrix} 10-3 \\ 0+1 \\ 5+2 \end{bmatrix} =$$

$$\begin{bmatrix} 7 \\ 1 \\ 7 \end{bmatrix}$$

$$3 \times 2 \cdot 2 \times 1 = 3 \times 1$$

$$\#12) \quad B = \begin{bmatrix} 2 & 5 \\ 3 & 7 \end{bmatrix} \quad C = \begin{bmatrix} 2 & 3 \\ 1 & 0 \\ 0 & 2 \end{bmatrix}$$

$$3X - B = C \quad 3X = C + B \quad X = \frac{C+B}{3}$$

No. solution for matrix X since B and C are not the same size and can't be added

$$\#30) \quad D(AB) \quad A = \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 & 5 \\ 1 & -1 & 3 \end{bmatrix} \quad D = [7 \ 3]$$

$$\begin{array}{l} AB \\ 2 \times 2 \cdot 2 \times 3 \\ \checkmark \end{array} \quad \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} \begin{bmatrix} 3 & 1 & 5 \\ 1 & -1 & 3 \end{bmatrix} = \begin{bmatrix} 6+5 & 1+5 & 10-15 \\ 0+7 & 0-7 & 0+21 \end{bmatrix}$$

$$= \begin{bmatrix} 11 & 6 & -5 \\ 7 & -7 & 21 \end{bmatrix} = AB$$

$$D(AB) \\ 1 \times 2, 2 \times 3 \quad \checkmark$$

$$\begin{bmatrix} 7 & 3 \end{bmatrix} \begin{bmatrix} 11 & 6 & -5 \\ 7 & -7 & 21 \end{bmatrix} = \begin{bmatrix} 77+11 & 42-11 & -35+21 \end{bmatrix}$$

$$= \boxed{\begin{bmatrix} 28 & 21 & 28 \end{bmatrix}}$$

$$\#32) \quad A^2 = \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} = \begin{bmatrix} 4+0 & -10+35 \\ 0+0 & 0+49 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & -45 \\ 0 & 49 \end{bmatrix}$$

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$$A = \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 1 & 5 \\ 1 & -1 & 3 \end{bmatrix} \quad E = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$$

2×2 2×3 3×1

$$AB = \begin{bmatrix} 2 & -5 \\ 0 & 7 \end{bmatrix} \begin{bmatrix} 3 & 1 & 5 \\ 1 & -1 & 3 \end{bmatrix} = \begin{bmatrix} 6+5 & 1+5 & 10-15 \\ 0+7 & 0-7 & 0+21 \end{bmatrix}$$

2×2 2×3 2×3

$$\begin{bmatrix} 1 & 6 & -5 & 5 \\ 7 & -7 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} 1+12+0 \\ 7-14+0 \end{bmatrix} = \begin{bmatrix} 13 \\ -7 \end{bmatrix}$$

2×3 3×1 2×1

#10

$$3 \begin{bmatrix} x & y \\ y & x \end{bmatrix} = \begin{bmatrix} 6 & -9 \\ -9 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 3x & 3y \\ 3y & 3x \end{bmatrix} = \begin{bmatrix} 6 & -9 \\ -9 & 6 \end{bmatrix}$$

$3x = 6$ $3y = -9$

$$\begin{matrix} x = 2 \\ y = -3 \end{matrix}$$

