

$$8. A = \begin{bmatrix} -2 \\ 4 \\ 1 \end{bmatrix}_{3 \times 1} \quad B = \begin{bmatrix} 5 & -1 & 3 \end{bmatrix}_{1 \times 3}$$

$$a) AB = \begin{bmatrix} -2 \\ 4 \\ 1 \end{bmatrix}_{3 \times 1} \begin{bmatrix} 5 & -1 & 3 \end{bmatrix}_{1 \times 3} = \begin{bmatrix} -2(5) & -2(-1) & -2(3) \\ 4(5) & 4(-1) & 4(3) \\ 1(5) & 1(-1) & 1(3) \end{bmatrix} = \begin{bmatrix} -10 & 2 & -6 \\ 20 & -4 & 12 \\ 5 & -1 & 3 \end{bmatrix}$$

$$b) BA = \begin{bmatrix} 5 & -1 & 3 \end{bmatrix}_{1 \times 3} \begin{bmatrix} -2 \\ 4 \\ 1 \end{bmatrix}_{3 \times 1} = \begin{bmatrix} 5(-2) + (-1)(4) + 3(1) \end{bmatrix} = \begin{bmatrix} -10 - 4 + 3 \end{bmatrix} = \begin{bmatrix} -11 \end{bmatrix}$$

$$9. a) AB = \begin{bmatrix} 1 & -2 \\ -3 & 4 \\ 5 & -1 \end{bmatrix}_{3 \times 2} \begin{bmatrix} 7 & 1 & 2 \\ 3 & -5 & -4 \end{bmatrix}_{2 \times 3} = \begin{bmatrix} 1(7) - 2(3) & 1(1) - 2(-5) & 1(2) - 2(-4) \\ -3(7) + 4(3) & -3(1) + 4(-5) & -3(2) + 4(-4) \\ 5(7) - 1(3) & 5(1) - 1(-5) & 5(2) - 1(-4) \end{bmatrix} = \begin{bmatrix} 1 & 11 & 10 \\ -9 & -23 & -22 \\ 32 & 10 & 14 \end{bmatrix}$$

$$b) BA = \begin{bmatrix} 7 & 1 & 2 \\ 3 & -5 & -4 \end{bmatrix}_{2 \times 3} \begin{bmatrix} 1 & -2 \\ -3 & 4 \\ 5 & -1 \end{bmatrix}_{3 \times 2} = \begin{bmatrix} 7(1) + 1(-3) + 2(5) & 7(-2) + 1(4) + 2(-1) \\ 3(1) - 5(-3) - 4(5) & 3(-2) - 5(4) - 4(-1) \end{bmatrix} = \begin{bmatrix} 14 & -12 \\ -2 & -22 \end{bmatrix}$$