

Assignment #14

14 3.2 p 239 # 1-10,18-24,30, 31

$$1. \quad [1 \quad 2 \quad 3] \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix} = [1 \cdot 4 + 2 \cdot 5 + 3 \cdot 6] = [32] \quad (\text{not } 32)$$

$$2. \quad [2 \quad 0 \quad 3] \begin{bmatrix} 0 \\ 1 \\ -3 \end{bmatrix} = [2 \cdot 0 + 0 \cdot 1 + 3(-3)] = [-9]$$

$$3. \quad [1 \quad 2] \begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix} = [1 \cdot 3 + 2 \cdot 4 \quad 1 \cdot 5 + 2 \cdot 6] \\ = [11 \quad 17]$$

$$4. \quad [3 \quad 0] \begin{bmatrix} 1 & 2 \\ 4 & 5 \end{bmatrix} = [3 \cdot 1 + 0 \cdot 4 \quad 3 \cdot 2 + 0 \cdot 5] = [3 \quad 6]$$

$$5. \quad 3A = \begin{bmatrix} 3(1) & 3(0) & 3(2) \\ 3(3) & 3(2) & 3(1) \\ 3(4) & 3(0) & 3(3) \end{bmatrix} = \begin{bmatrix} 3 & 0 & 6 \\ 9 & 6 & 3 \\ 12 & 0 & 9 \end{bmatrix}$$

$$6. \quad 4D = \begin{bmatrix} 4(4) & 4(2) \\ 4(3) & 4(5) \end{bmatrix} = \begin{bmatrix} 16 & 8 \\ 12 & 20 \end{bmatrix}$$

$$7. \quad 4C + 2D = \begin{bmatrix} 4(5) & 4(3) \\ 4(1) & 4(2) \end{bmatrix} + \begin{bmatrix} 2(4) & 2(2) \\ 2(3) & 2(5) \end{bmatrix} \\ = \begin{bmatrix} 20 & 12 \\ 4 & 8 \end{bmatrix} + \begin{bmatrix} 8 & 4 \\ 6 & 10 \end{bmatrix} \\ = \begin{bmatrix} 28 & 16 \\ 10 & 18 \end{bmatrix}$$

$$8. \quad 5C - 3D = \begin{bmatrix} 5(5) & 5(3) \\ 5(1) & 5(2) \end{bmatrix} - \begin{bmatrix} 3(4) & 3(2) \\ 3(3) & 3(5) \end{bmatrix} \\ = \begin{bmatrix} 25 & 15 \\ 5 & 10 \end{bmatrix} - \begin{bmatrix} 12 & 6 \\ 9 & 15 \end{bmatrix} = \begin{bmatrix} 13 & 9 \\ -4 & -5 \end{bmatrix}$$

9. $2A - 3B$

Matrices are not the same size and cannot be combined.

10. Undefined. B and F are not the same order.

18. EC is undefined.

19. BA is undefined.

$$20. CE = \begin{bmatrix} 5 & 3 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 5+15 & 0+3 & 20+0 \\ 1+10 & 0+2 & 4+0 \end{bmatrix} = \begin{bmatrix} 20 & 3 & 20 \\ 11 & 2 & 4 \end{bmatrix}$$

$$21. EB = \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 & 1 & 3 & 0 \\ 4 & 2 & 1 & 1 \\ 3 & 2 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 1+0+12 & 1+0+8 & 3+0+0 & 0+0+4 \\ 5+4+0 & 5+2+0 & 15+1+0 & 0+1+0 \end{bmatrix} = \begin{bmatrix} 13 & 9 & 3 & 4 \\ 9 & 7 & 16 & 1 \end{bmatrix}$$

22. BE is undefined.

$$23. EA^T = \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 & 3 & 4 \\ 0 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix} = \begin{bmatrix} 1+0+8 & 3+0+4 & 4+0+12 \\ 5+0+0 & 15+2+0 & 20+0+0 \end{bmatrix} = \begin{bmatrix} 9 & 7 & 16 \\ 5 & 17 & 20 \end{bmatrix}$$

$$24. AE^T = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 2 & 1 \\ 4 & 0 & 3 \end{bmatrix} \begin{bmatrix} 1 & 5 \\ 0 & 1 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} 1+0+8 & 5+0+0 \\ 3+0+4 & 15+2+0 \\ 4+0+12 & 20+0+0 \end{bmatrix} = \begin{bmatrix} 9 & 5 \\ 7 & 17 \\ 16 & 20 \end{bmatrix}$$

$$30. (CD)E = \left(\begin{bmatrix} 5 & 3 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 4 & 2 \\ 3 & 5 \end{bmatrix} \right) \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 29 & 25 \\ 10 & 12 \end{bmatrix} \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 154 & 25 & 116 \\ 70 & 12 & 40 \end{bmatrix}$$

$$C(DE) = \begin{bmatrix} 5 & 3 \\ 1 & 2 \end{bmatrix} \left(\begin{bmatrix} 4 & 2 \\ 3 & 5 \end{bmatrix} \begin{bmatrix} 1 & 0 & 4 \\ 5 & 1 & 0 \end{bmatrix} \right) = \begin{bmatrix} 5 & 3 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 14 & 2 & 16 \\ 28 & 5 & 12 \end{bmatrix} = \begin{bmatrix} 154 & 25 & 116 \\ 70 & 12 & 40 \end{bmatrix}$$

They are equal.

31. No. See problems 11 and 13.