

2.38(b)

1 2.38(b), §1 Asked

Given:

$$A = \begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix} \quad B = \begin{pmatrix} 5 & 0 \\ -6 & 7 \end{pmatrix} \quad C = \begin{pmatrix} 1 & -3 & 4 \\ 2 & 6 & -5 \end{pmatrix}$$

Asked:

$$BC \text{ and } A(BC)$$

2 2.38(b), §2 Solution

$$\begin{aligned} BC &= \begin{pmatrix} 5 & 0 \\ -6 & 7 \end{pmatrix} \begin{pmatrix} 1 & -3 & 4 \\ 2 & 6 & -5 \end{pmatrix} \\ &= \begin{pmatrix} 5 \cdot 1 + 0 \cdot 2 & 5 \cdot (-3) + 0 \cdot 6 & 5 \cdot 4 + 0 \cdot (-5) \\ -6 \cdot 1 + 7 \cdot 2 & -6 \cdot (-3) + 7 \cdot 6 & -6 \cdot 4 + 7 \cdot (-5) \end{pmatrix} \\ &= \begin{pmatrix} 5 & -15 & 20 \\ 8 & 60 & -59 \end{pmatrix} \end{aligned}$$

$$\begin{aligned} A(BC) &= \begin{pmatrix} 1 & 2 \\ 3 & -4 \end{pmatrix} \begin{pmatrix} 5 & -15 & 20 \\ 8 & 60 & -59 \end{pmatrix} \\ &= \begin{pmatrix} 21 & 105 & -98 \\ -17 & -285 & 296 \end{pmatrix} \end{aligned}$$