

1 | Matrices

1.1 | 1a

$BA = \begin{bmatrix} 58 & 64 \\ 139 & 154 \end{bmatrix}$ BA is not equal to AB because $AB \in \mathbb{R}^{3 \times 3}$ whereas $BA \in \mathbb{R}^{2 \times 2}$ so there's no way that $AB = BA$ could be true.

1.2 | 1b

$$\begin{aligned} \det(BA) &= (58)(154) - (64)(139) \\ &= 36 \end{aligned}$$

1.3 | 1c

$$AB = \begin{bmatrix} 39 & 54 & 69 \\ 49 & 68 & 87 \\ 59 & 82 & 109 \end{bmatrix}$$

$$\begin{aligned} \det(AB) &= (39)(68)(109) + (54)(87)(59) + (69)(49)(82) - (69)(68)(59) - (54)(49)(109) - (39)(87)(82) \\ &= 24 \end{aligned}$$