1 | **Matrices**

1.1 | **1a**

$BA = \begin{bmatrix} 58 & 64 \\ 139 & 154 \end{bmatrix}$ BA is not equal to AB because $AB \in \mathbb{R}^{3\times3}$ whereas $BA \in \mathbb{R}^{2\times2}$ 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**

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

$$\begin{aligned} det(AB) &= (30)(68)(109) + (54)(87)(59) + (69)(49)(82) - (69)(68)(59) - (54)(49)(109) - (39)(87)(82) \\ &= -6684 \end{aligned}$$