

$$a = 3 \tag{1}$$

$$3a = 9 \tag{2}$$

$$b = \begin{pmatrix} 4 \\ 5 \\ 6 \end{pmatrix} \tag{3}$$

$$a \cdot b = \begin{pmatrix} 12 \\ 15 \\ 18 \end{pmatrix} \tag{4}$$

$$c = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 5 \end{bmatrix} \tag{5}$$

$$c \cdot b = \begin{pmatrix} 12 \\ 10 \\ 30 \end{pmatrix} \tag{6}$$