

問1.

$$A = \begin{pmatrix} 1 & 2 & -1 \\ 0 & 2 & 3 \\ -1 & 0 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 3 & 2 \\ 2 & -1 \end{pmatrix}$$

$$C = \begin{pmatrix} 1 & 6 \\ 0 & 1 \\ -2 & -5 \end{pmatrix} \quad \text{とする。}$$

次のうち積が定義できるのは、いくつか。

$$AB, A^2 = A \cdot A, B^2 = B \cdot B, C^2 = C \cdot C \\ BA, AC, CA, BC, CB$$

(1) 個

問2.

$$A = \begin{pmatrix} 1 & 0 & -1 \\ 2 & 2 & 0 \\ 1 & 0 & 5 \end{pmatrix}, B = \begin{pmatrix} 5 & 0 \\ 0 & 2 \\ 1 & 2 \end{pmatrix}$$

$$AB = \begin{pmatrix} a & d \\ b & e \\ c & f \end{pmatrix}$$

$$a+b+c+d+e+f = \text{(2)}$$

問1.

A (3,3)型

B (2,2)型

C (3,2)型

$$A^2 = A \cdot A \quad \text{OK.}$$

$$\underbrace{(3,3)\text{型} \times (3,3)\text{型}} = (3,3)\text{型}$$

$$B^2 = B \cdot B \quad \text{OK}$$

$$\underbrace{(2,2)\text{型} \times (2,2)\text{型}} = (2,2)\text{型}$$

A·C

$$(3,3)\text{型} \times (3,2)\text{型} = (3,2)\text{型} \quad \text{OK}$$

CB

$$\underbrace{(3,2)\text{型} \times (2,2)\text{型}} = (3,2)\text{型} \quad \text{OK}$$

$$\boxed{(1)} = 4.$$

問2.

$$AB = \left(\begin{array}{ccc|c} 1 & 0 & -1 & 5 \\ 2 & 2 & 0 & 0 \\ 1 & 0 & 5 & 1 \end{array} \right) \begin{pmatrix} 5 \\ 0 \\ 2 \\ 2 \end{pmatrix}$$

$$= \left(\begin{array}{cc|c} 4 & -2 & \\ \hline 10 & 4 & \\ \hline 10 & 10 & \end{array} \right)$$

$$a+b+c+d+e+f = 4+10+10-2+4+10$$

$$= 36 = \boxed{(2)}$$