

問1. サイコロを2個ふる試行

$X =$ "出る目の和"

$$P(X=2) = \frac{1}{36}$$

$$P(X=3) = \frac{1}{18}$$

$$P(X \leq 4) = \frac{\boxed{(1)}}{\boxed{(2)}} \quad \text{既約分数}$$

問2.

$$f(x) = \begin{cases} \alpha(x-1)(x-3) & (1 \leq x \leq 3) \\ 0 & (\text{その他}) \end{cases}$$

が確率密度となるように α の値を定めよ.

つまり、
$$\int_{-\infty}^{\infty} f(x) dx = 1,$$

をみたす α は何か.

$$\alpha = \frac{\boxed{(3)}}{\boxed{(4)}} \quad \text{既約分数}$$

解答例)

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

$$\boxed{(2)} = 6$$

$$\boxed{(3)} = 3$$

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

問1.

標本空間 $\mathcal{S} = \{(\bar{i}, \bar{j}) \mid \bar{i}, \bar{j} = 1, 2, 3, 4, 5, 6\}$

$$\{s \in \mathcal{S} \mid X(s) = 2\} = \{(1, 1)\}$$

$$\{ \text{''} \mid X(s) = 3 \} = \{(1, 2), (2, 1)\}$$

$$\{ \text{''} \mid X(s) = 4 \} = \{(1, 3), (2, 2), (3, 1)\}$$

$$P(X \leq 4) = \frac{1 + 2 + 3}{36} = \frac{1}{6}$$

問2.

$$\begin{aligned} 1 &= \int_{-\infty}^{\infty} f(x) dx = \int_1^3 \alpha(x-1)(x-3) dx \\ &= \alpha \int_1^3 (x^2 - 4x + 3) dx \\ &= \alpha \left[\frac{1}{3}x^3 - 2x^2 + 3x \right]_1^3 \end{aligned}$$

$$= \alpha \times \left(-\frac{4}{3}\right)$$

$$\therefore \underline{\alpha = -\frac{3}{4}}$$

(3)