

2015年文系第4問

4 $0^\circ \leq \theta \leq 45^\circ$ で $\sin \theta \cos \theta = \frac{2}{5}$ のとき、次の式の値をそれぞれ求めなさい。

- (1) $(\sin \theta + \cos \theta)^2$
- (2) $\sin \theta + \cos \theta$
- (3) $(\sin \theta - \cos \theta)^2$
- (4) $\sin \theta - \cos \theta$
- (5) $\sin \theta$

$$\begin{aligned}
 (1) (\sin \theta + \cos \theta)^2 &= \sin^2 \theta + \cos^2 \theta + 2 \sin \theta \cos \theta \\
 &= 1 + \frac{4}{5} \\
 &= \underline{\underline{\frac{9}{5}}} //
 \end{aligned}$$

(2) $0^\circ \leq \theta \leq 45^\circ$ より、 $\sin \theta + \cos \theta > 0$

$$\therefore (1) \text{より}, \quad \sin \theta + \cos \theta = \underline{\underline{\frac{3\sqrt{5}}{5}}} //$$

$$\begin{aligned}
 (3) (\sin \theta - \cos \theta)^2 &= \sin^2 \theta + \cos^2 \theta - 2 \sin \theta \cos \theta \\
 &= 1 - \frac{4}{5} \\
 &= \underline{\underline{\frac{1}{5}}} //
 \end{aligned}$$

(4) $0^\circ \leq \theta \leq 45^\circ$ より、 $\sin \theta \leq \cos \theta \quad \therefore \sin \theta - \cos \theta \leq 0$

$$\therefore (3) \text{より}, \quad \sin \theta - \cos \theta = \underline{\underline{-\frac{\sqrt{5}}{5}}} //$$

$$(5) \sin \theta + \cos \theta = \underline{\underline{\frac{3\sqrt{5}}{5}}} \cdots ①$$

$$\sin \theta - \cos \theta = \underline{\underline{-\frac{\sqrt{5}}{5}}} \cdots ②$$

$$\begin{aligned}
 ① + ② \text{より}, \quad 2 \sin \theta &= \frac{2\sqrt{5}}{5} \quad \therefore \sin \theta = \underline{\underline{\frac{\sqrt{5}}{5}}} // \\
 &
 \end{aligned}$$