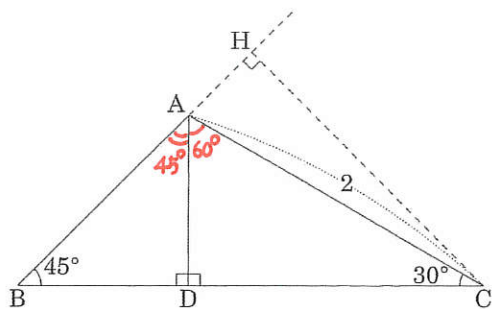


2015年A日程第3問



3 下の図について、次の値を求めよ。



- (1) $AB = \frac{\sqrt{2}}{2}$, $BC = \frac{1+\sqrt{3}}{2}$
- (2) $\triangle ABC$ の面積 = $\frac{1+\sqrt{3}}{2}$
- (3) $CH = \frac{\sqrt{2}+\sqrt{6}}{2}$
- (4) $\sin 105^\circ = \frac{\sqrt{2}+\sqrt{6}}{4}$, $\cos 105^\circ = \frac{\sqrt{2}-\sqrt{6}}{4}$

(1) $AD = 1$ であるから、 $AB = \sqrt{2}$ //また、 $BD = 1$, $DC = \sqrt{3}$ より、 $BC = 1 + \sqrt{3}$ //

$$\begin{aligned} (2) \triangle ABC &= \frac{1}{2} \cdot BC \cdot AD \\ &= \frac{1+\sqrt{3}}{2} \end{aligned} //$$

$$\begin{aligned} (3) \triangle ABC &= \frac{1}{2} \cdot AB \cdot CH \\ &= \frac{\sqrt{2}}{2} CH \end{aligned}$$

$$(2) \text{より、} \frac{\sqrt{2}}{2} CH = \frac{1+\sqrt{3}}{2} \quad \therefore CH = \frac{\sqrt{2}+\sqrt{6}}{2} //$$

$$\begin{aligned} (4) \triangle ABC &= \frac{1}{2} \cdot AB \cdot AC \cdot \sin 105^\circ \\ &= \sqrt{2} \sin 105^\circ \end{aligned}$$

$$(2) \text{より、} \sqrt{2} \sin 105^\circ = \frac{1+\sqrt{3}}{2} \quad \therefore \sin 105^\circ = \frac{\sqrt{2}+\sqrt{6}}{4} //$$

$$\begin{aligned} \sin^2 105^\circ + \cos^2 105^\circ &= 1 \text{ より、} \cos^2 105^\circ = \frac{2-\sqrt{3}}{4} \\ \cos 105^\circ < 0 \text{ より、} \cos 105^\circ &= -\sqrt{\frac{4-2\sqrt{3}}{8}} \quad \therefore \cos 105^\circ = \frac{\sqrt{2}-\sqrt{6}}{4} // \end{aligned}$$

二重根号をはずす