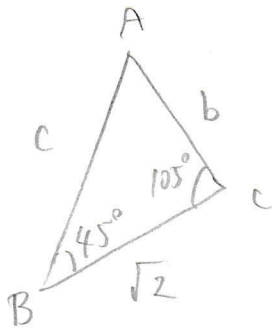


calculator



△ABCにおいて、 $a = \sqrt{2}$, $\angle B = 45^\circ$, $\angle C = 105^\circ$ のとき、残りの辺の長さや角の大きさを求めよ。



$$\begin{aligned} \angle A &= 180^\circ - (45^\circ + 105^\circ) \\ &= 30^\circ \end{aligned}$$

正弦定理より

$$\frac{\sqrt{2}}{\sin 30^\circ} = \frac{b}{\sin 45^\circ}$$

$$= \sqrt{2} \sin 45^\circ = b \sin 30^\circ$$

$$\sqrt{2} \cdot \frac{1}{\sqrt{2}} = b \cdot \frac{1}{2}$$

$$\underline{b = 2}$$

C=xとおいて余弦定理を用いる

$$(\sqrt{2})^2 = x^2 + 2^2 - 2 \cdot 2 \cdot x \cos 30^\circ$$

$$2 = x^2 + 4 - 2\sqrt{3}x$$

$$x^2 - 2\sqrt{3}x + 2 = 0$$

$$(x - \sqrt{3})^2 - 1 = 0$$

$$(x - \sqrt{3})^2 = 1$$

$$x - \sqrt{3} = \pm 1$$

$$x = \sqrt{3} \pm 1$$

1

$$2 < c < \sqrt{2} + 2 \quad \text{よって}$$

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$$\underline{c = \sqrt{3} + 1}$$

以上より $\angle A = 30^\circ$, $b = 2$, $c = \sqrt{3} + 1$

$$4 = c^2 + 2 - 2c\sqrt{2} \cdot \frac{1}{\sqrt{2}}$$

$$c^2 - 2c - 2 = 0$$

$$(c-1)^2 = 3$$

$$c-1 = \pm\sqrt{3}$$

$$c = 1 \pm \sqrt{3}$$

$$c > 0 \text{ より } 1 + \sqrt{3}$$