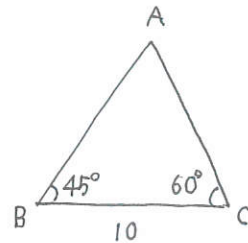


2011年 歯・薬学部 (中期) 第4問

 4 三角形 ABC で $\angle B = 45^\circ$, $\angle C = 60^\circ$, $BC = 10$ のとき,

$$\sin A = \frac{\sqrt{2} + \sqrt{\boxed{\text{ア}}}}{\boxed{\text{イ}}}$$

 で, AB の長さは $\boxed{\text{ウエ}} \sqrt{\boxed{\text{オ}}} - \boxed{\text{カ}} \sqrt{\boxed{\text{キ}}}$,

 AC の長さは $\boxed{\text{クケ}} \sqrt{\boxed{\text{コ}}} - \boxed{\text{サン}}$ である.


$$\angle A = 180^\circ - (45^\circ + 60^\circ) = 75^\circ \text{ より}$$

$$\begin{aligned} \sin A &= \sin(45^\circ + 30^\circ) \\ &= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \\ &= \frac{\sqrt{6} + \sqrt{2}}{4} \end{aligned}$$

$$\text{正弦定理より, } \frac{10}{\sin A} = \frac{AB}{\sin 60^\circ}$$

$$\therefore \frac{\sqrt{6} + \sqrt{2}}{4} \cdot AB = 5\sqrt{3}$$

$$\begin{aligned} AB &= 5\sqrt{3} \cdot \frac{4}{\sqrt{6} + \sqrt{2}} \\ &= \frac{20\sqrt{3}(\sqrt{6} - \sqrt{2})}{(\sqrt{6} + \sqrt{2})(\sqrt{6} - \sqrt{2})} \\ &= \frac{15\sqrt{2} - 5\sqrt{6}}{\quad} \end{aligned}$$

$$\frac{10}{\sin A} = \frac{AC}{\sin 45^\circ}$$

$$\therefore 5\sqrt{2} = \frac{\sqrt{6} + \sqrt{2}}{4} AC$$

$$\therefore AC = \frac{10\sqrt{3} - 10}{\quad}$$