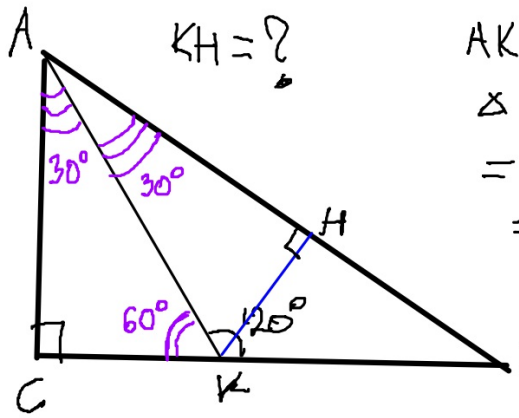

$AK = 38$ cm

$\angle AKB = 120^\circ \Rightarrow \angle AKC = 180^\circ - \angle AKB = 60^\circ$

$\Rightarrow \angle CAK = 180^\circ - \angle C - \angle AKC = 180^\circ - 90^\circ - 60^\circ = 30^\circ$

$\Rightarrow \Delta ACK: AC = AK \cdot \cos \angle CAK = \frac{38 \cdot \sqrt{3}}{2} = 19\sqrt{3}$ cm

$CK = 38 \cdot \sin \angle CAK = 38 \cdot 0.5 = 19$ cm

В ΔACB $\angle B = 90^\circ - \angle A = 90^\circ - 2 \cdot \angle CAK = 30^\circ$

$\Rightarrow AB = 2 \cdot AC = 38\sqrt{3}$ cm (AC — катет и лежит напротив угла $\angle B = 30^\circ \Rightarrow$ гипотенуза AB в 2 раза больше AC)

$CB^2 = AB^2 - AC^2 = 38^2 \cdot 3 - 19^2 \cdot 3 = 3249$

$CB = 57$ cm. $S_{\Delta ABC} = CB \cdot AC : 2 = 57 \cdot 19\sqrt{3} : 2 = \frac{1083\sqrt{3}}{2}$

$S_{\Delta ACK} = CK \cdot AC : 2 = 19 \cdot 19\sqrt{3} : 2 = \frac{361\sqrt{3}}{1} \Rightarrow S_{\Delta AKB} = S_{\Delta ABC} - S_{\Delta ACK}$

$\Rightarrow S_{\Delta AKB} = \frac{(1083 - 361) \cdot \sqrt{3}}{2} = 361\sqrt{3}$. $S_{\Delta AKB} = AB \cdot KH : 2 \Rightarrow KH = 361 \cdot 2 \cdot \sqrt{3} : 38\sqrt{3}$

$\Rightarrow$ **AK = 19 cm**