

$$\triangle AM_2C: CH_2 = \frac{1}{2} AC (\text{гипотенуз } \angle = 30^\circ)$$

$$\triangle ECH_2: CE = \frac{CH_2}{\sin 40^\circ} = \frac{AC}{2 \sin 40^\circ} \quad (1)$$

$$\triangle ACE: \frac{EC}{\sin 30^\circ} = \frac{AE}{\sin 10^\circ} = \frac{AC}{\sin 140^\circ} \quad (2)$$

$$\triangle BHE: HE = \frac{1}{2} AE = BE \cdot \cos 80^\circ$$

$$AE = 2BE \cdot \cos 80^\circ$$

$$\text{из (2)} \quad \frac{AE}{\sin 10^\circ} = \frac{AC}{\sin 140^\circ}$$

$$AE = \frac{AC \cdot \sin 10^\circ}{\sin 140^\circ}$$

$$BE = \frac{AE}{2 \cos 80^\circ} = \frac{AC \cdot \sin 10^\circ}{\sin 140^\circ \cdot 2 \cos 80^\circ} = \frac{AC}{2 \sin 140^\circ} \quad (3)$$

$$\sin 10^\circ = \cos 80^\circ$$

$$(1) = (3) \Rightarrow BE = CE$$

$$\Rightarrow \triangle BEC \text{ равнобедренный и } \angle BEC = 60^\circ$$

$$\Rightarrow \triangle BEC \text{ равносторонний.}$$

ч.т.д.