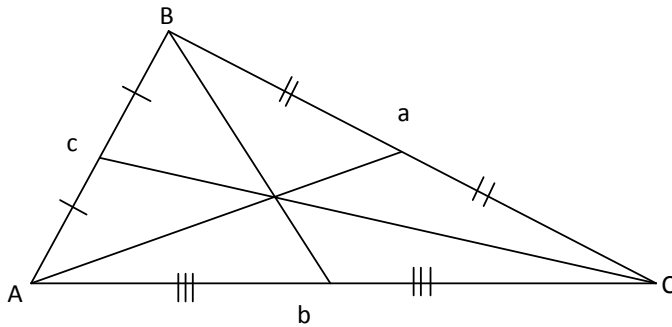


In ABC, $m(\angle)A=35$ and $m(\angle)C=77$. What is the longest side of the triangle?

Solution:



Using Apollonius' theorem we have:

$$a = \frac{2}{3} \sqrt{-m_a^2 + 2m_b^2 + 2m_c^2} = \frac{2}{3} \sqrt{2m_b^2 + 10633} \quad (1)$$

$$b = \frac{2}{3} \sqrt{-m_b^2 + 2m_a^2 + 2m_c^2} = \frac{2}{3} \sqrt{-m_b^2 + 14308} \quad (2)$$

$$c = \frac{2}{3} \sqrt{-m_c^2 + 2m_b^2 + 2m_a^2} = \frac{2}{3} \sqrt{2m_b^2 - 9408} \quad (3)$$

(1), (3) $\rightarrow a > c$

Median $m(\angle)C$ is more than twice greater than median $m(\angle)A$. So, $m(\angle)A < m(\angle)B < m(\angle)C$ (Otherwise triangle doesn't exist).

Using it we have $a > b$ and $b > c$

So, $a > b > c \rightarrow a$ is the longest side.

Answer: a is the longest side.