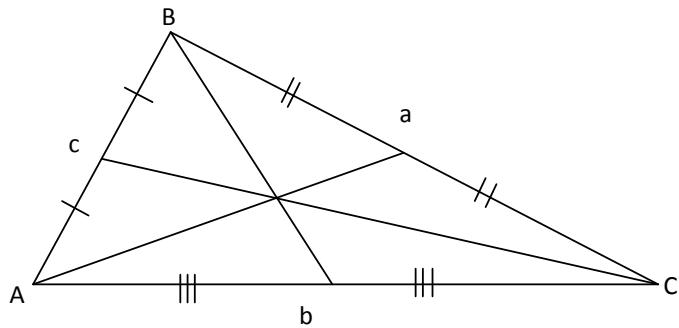


In  $\triangle ABC$ ,  $m(\angle A) = 35$  and  $m(\angle C) = 77$ . What is the longest side of the triangle?

**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.**