

Дан треугольник, и три его стороны a,b,c. найти угол A

$$a^2 = b^2 + c^2 - 2bc \cos A$$

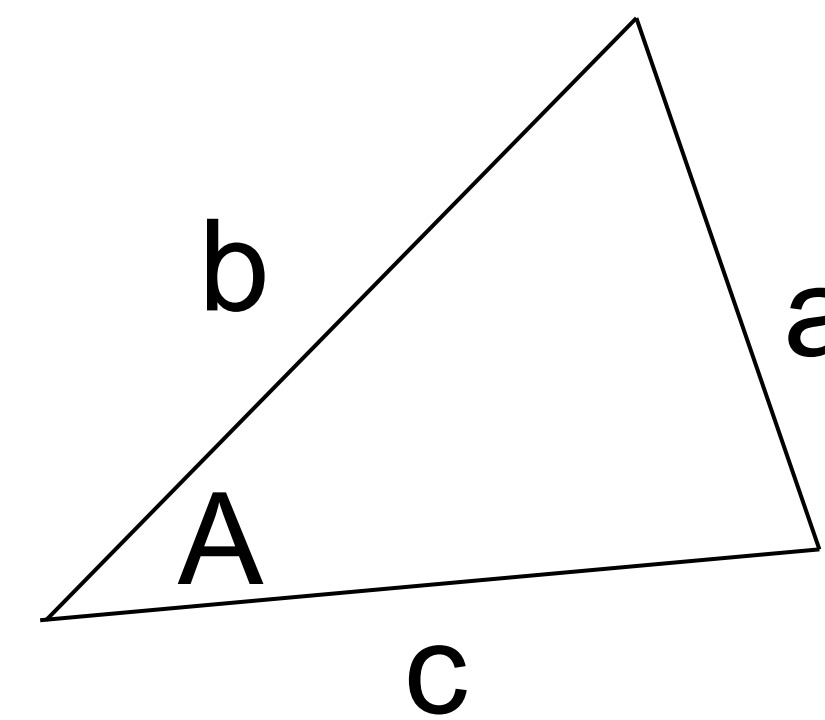
$$\cos A = (b^2 + c^2 - a^2) / 2bc$$

$$A = \arccos((b^2 + c^2 - a^2) / 2bc)$$

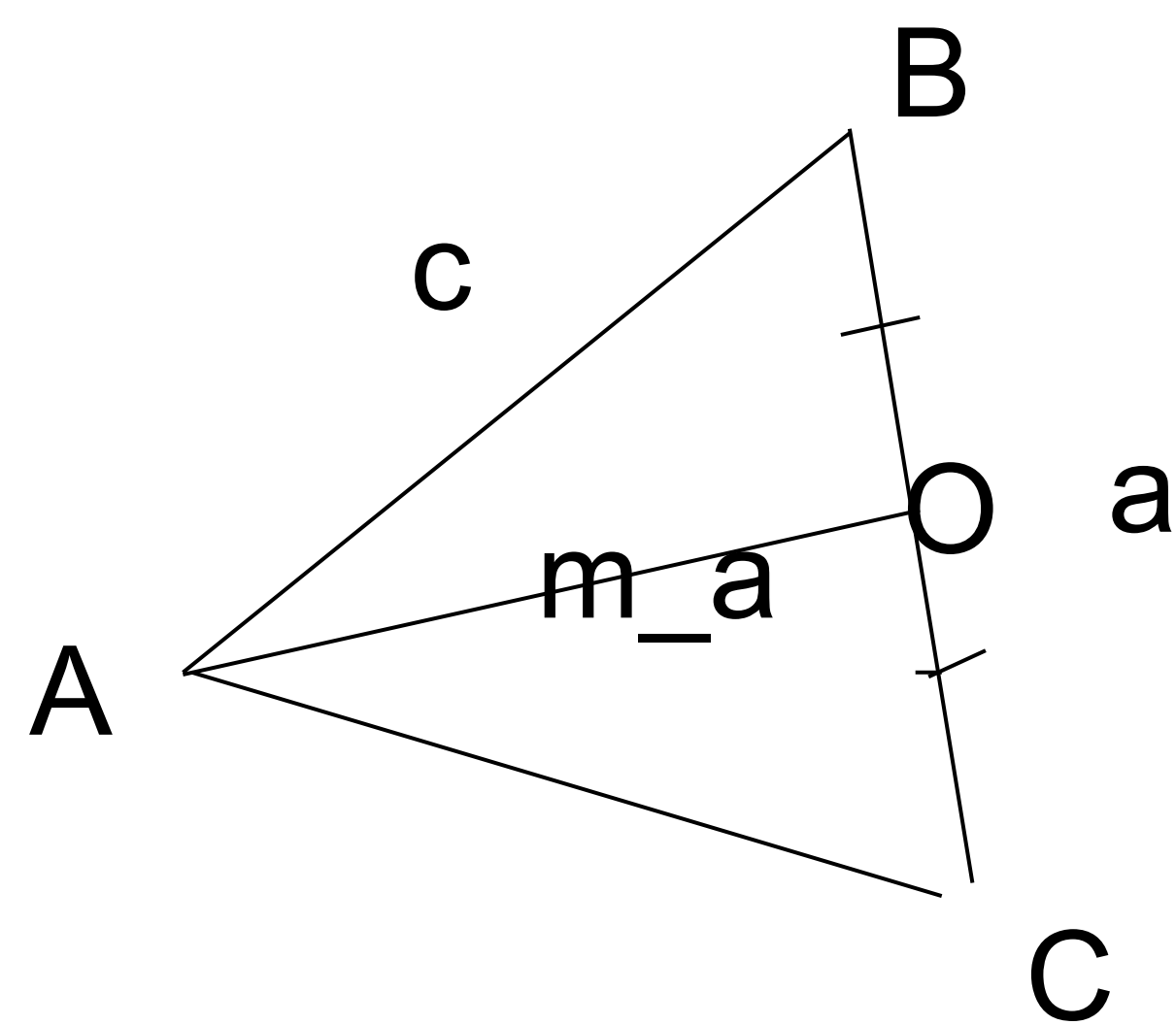
$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$



Дан треугольник ABC, и две его стороны a,c, m_a. найти AC



$$AC^2 = m_a^2 + (a/2)^2 - 2m_a \cdot a/2 \cdot \cos AOC$$

$$\cos AOB = (m_a^2 + (a/2)^2 - c^2) / 2 \cdot m_a \cdot (a/2)$$

$$\cos(180 - AOC) = (m_a^2 + (a/2)^2 - c^2) / 2 \cdot m_a \cdot (a/2)$$

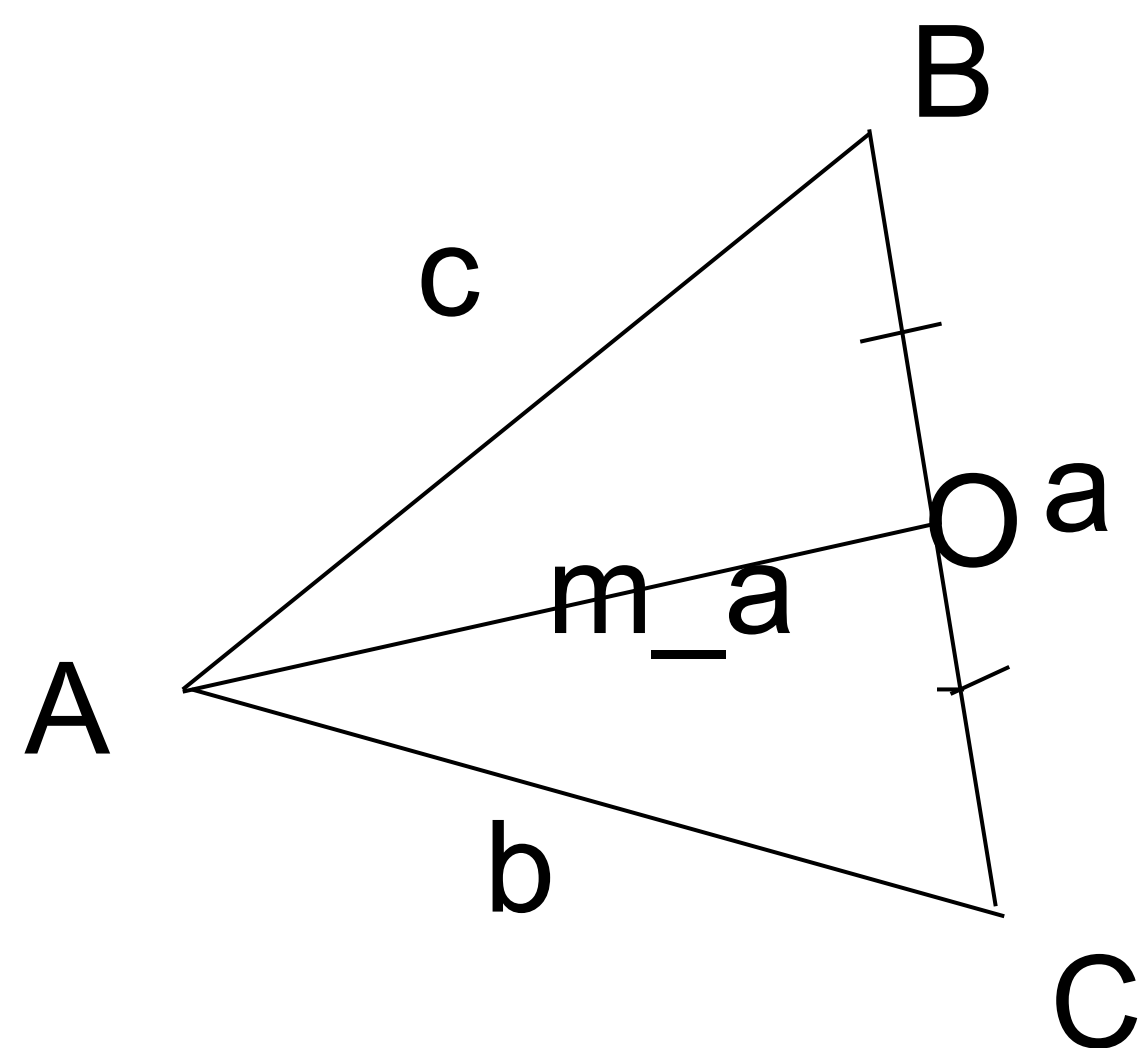
$$\cos(180 - AOC) = \cos(180) \cdot \cos AOC + \sin(180) \cdot \sin AOC = -\cos AOC$$

$$AC^2 = m_a^2 + (a/2)^2 + 2m_a \cdot (a/2) \cdot (m_a^2 + (a/2)^2 - c^2) / 2 \cdot m_a \cdot (a/2) =$$

$$= m_a^2 + (a/2)^2 + m_a^2 + (a/2)^2 - c^2 = 2m_a^2 + 2(a/2)^2 - c^2 =$$

$$= 2m_a^2 + a^2/2 - c^2 = (4m_a^2 + a^2 - 2c^2) / 2$$

Дан треугольник ABC, и три его стороны a,b,c. найти m_a



$$m_a^2 = c^2 + (a/2)^2 - 2c(a/2) \cdot \cos B$$

$$\cos B = (c^2 + a^2 - b^2) / 2ca$$

$$m_a^2 = c^2 + (a/2)^2 - 2c(a/2) \cdot (c^2 + a^2 - b^2) / 2ca =$$

$$= c^2 + (a/2)^2 - (c^2 + a^2 - b^2) / 2 = (4c^2 + a^2 - 2(c^2 + a^2 - b^2)) / 4 =$$

$$= (4c^2 + a^2 - 2c^2 - 2a^2 + 2b^2) / 4 = (2c^2 - a^2 + 2b^2) / 4$$