

3.1 Right Triangle

Legs of a right triangle: a, b

Hypotenuse: c

Altitude: h

Medians: m_a, m_b, m_c

Angles: α, β

Radius of circumscribed circle: R

Radius of inscribed circle: r

Area: S

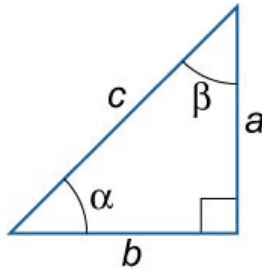


Figure 8.

156. $\alpha + \beta = 90^\circ$

157. $\sin \alpha = \frac{a}{c} = \cos \beta$

158. $\cos \alpha = \frac{b}{c} = \sin \beta$

159. $\tan \alpha = \frac{a}{b} = \cot \beta$

160. $\cot \alpha = \frac{b}{a} = \tan \beta$

161. $\sec \alpha = \frac{c}{b} = \operatorname{cosec} \beta$

162. $\operatorname{cosec} \alpha = \frac{c}{a} = \sec \beta$

163. Pythagorean Theorem

$$a^2 + b^2 = c^2$$

164. $a^2 = fc$, $b^2 = gc$,

where f and c are projections of the legs a and b , respectively, onto the hypotenuse c .

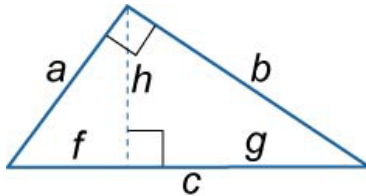


Figure 9.

165. $h^2 = fg$,
where h is the altitude from the right angle.

166. $m_a^2 = b^2 - \frac{a^2}{4}$, $m_b^2 = a^2 - \frac{b^2}{4}$,
where m_a and m_b are the medians to the legs a and b .

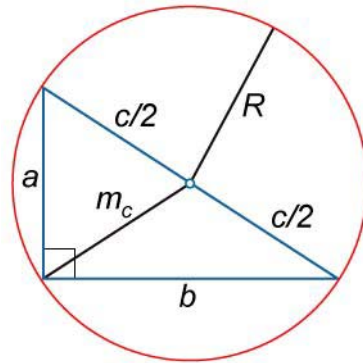


Figure 10.

167. $m_c = \frac{c}{2}$,
where m_c is the median to the hypotenuse c .

168. $R = \frac{c}{2} = m_c$

169. $r = \frac{a + b - c}{2} = \frac{ab}{a + b + c}$

170. $ab = ch$

$$171. \quad s = \frac{ab}{2} = \frac{ch}{2}$$