3.11 Isosceles Trapezoid with Inscribed Circle

Bases of a trapezoid: a, b
Leg: c
Midline: q
Altitude: h
Diagonal: d
Radius of inscribed circle: R
Radius of circumscribed circle: r
Perimeter: L
Area: S

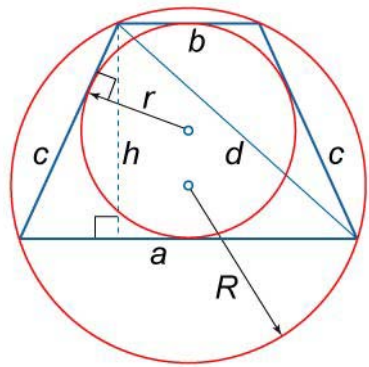

Figure 22.

223. $a + b = 2c$

224. $q = \frac{a+b}{2} = c$

225. $d^2 = h^2 + c^2$

226. $r = \frac{h}{2} = \frac{\sqrt{ab}}{2}$

227. $R = \frac{cd}{2h} = \frac{cd}{4r} = \frac{c}{2}\sqrt{1+\frac{c^2}{ab}} = \frac{c}{2h}\sqrt{h^2+c^2} = \frac{a+b}{8}\sqrt{\frac{a}{b}+6+\frac{b}{a}}$

228. $L = 2(a+b) = 4c$

229. $S = \frac{a+b}{2}\cdot h = \frac{(a+b)\sqrt{ab}}{2} = qh = ch = \frac{Lr}{2}$