3.14 Cyclic Quadrilateral

Sides of a quadrilateral: a, b, c, d
Diagonals: d_1, d_2
Angle between the diagonals: φ
Internal angles: $\alpha, \beta, \gamma, \delta$
Radius of circumscribed circle: R
Perimeter: L
Semiperimeter: p
Area: S

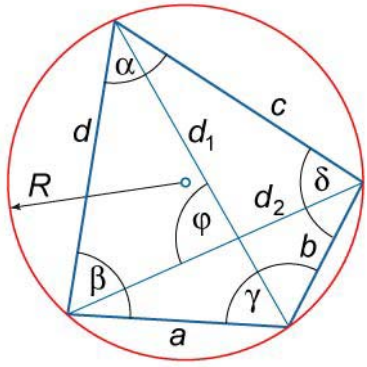

Figure 25.

237. $\alpha + \gamma = \beta + \delta = 180°$

238. Ptolemy's Theorem
$ac + bd = d_1 d_2$

239. $L = a + b + c + d$

240. $R = \frac{1}{4}\sqrt{\frac{(ac+bd)(ad+bc)(ab+cd)}{(p-a)(p-b)(p-c)(p-d)}}$,
where $p = \frac{L}{2}$.

241. $S = \frac{1}{2} d_1 d_2 \sin\varphi$,
$S = \sqrt{(p-a)(p-b)(p-c)(p-d)}$,
where $p = \frac{L}{2}$.