

## Feedback: Note 95.14 Equi-angular cyclic and equilateral circumscribed polygons (March 2011)

Michael de Villiers writes: The dual results in the above note for semi-regular angle- and side-gons, which respectively are generalizations of a rectangle and a rhombus, can be further generalised as follows.

### *Theorem 1*

A cyclic  $2n$ -gon has  $n$  distinct pairs of adjacent angles equal, if and only if, one set of alternate sides are equal.

### *Theorem 2*

A circumscribed  $2n$ -gon has  $n$  distinct pairs of adjacent sides equal, if and only if, one set of alternate angles are equal.

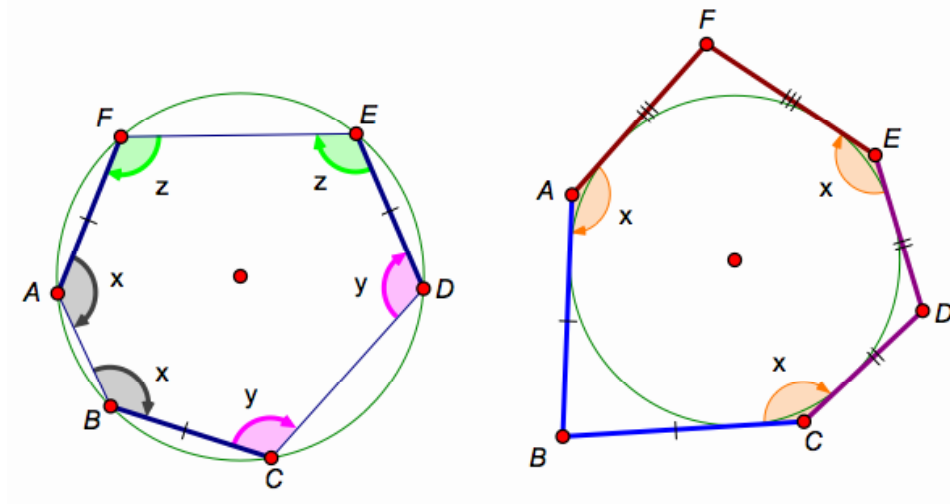


Figure 1

Both results are illustrated in Figure 1 (dynamically also at <http://dynamicmathematicslearning.com/alternate-angle-cyclic-general.html>), the first theorem by the cyclic hexagon and the second theorem by the circumscribed hexagon. Both results can be proved in exactly the same way as those of the original note. Note that the first theorem is a generalization of an isosceles trapezium while the second one is a generalization of its dual, which is a kite.

### Reference

De Villiers, M. (2011). Note 95.14: Equi-angled cyclic and equilateral circumscribed polygons. *The Mathematical Gazette*, 95(532), March 2011, pp. 102-106. (Available from <http://dynamicmathematicslearning.com/equi-anglecyclicpoly.pdf>)