Adjacent Interior Angles

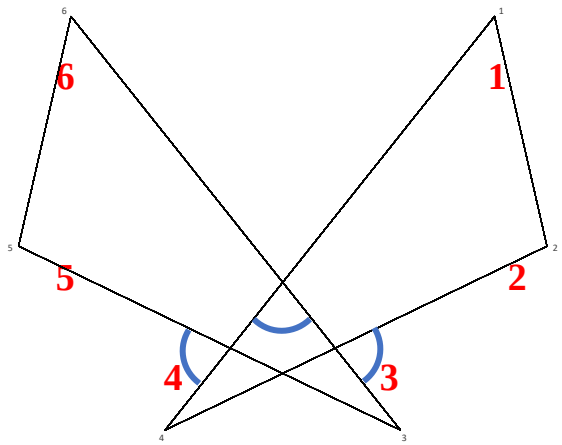
Consider the angle created using the intersecting lines coming from *two adjacent starting points* as arms of the angle. We use *starting points* to describe lines to avoid ambiguity because each of the images below have two lines at vertices (except 7) one based on that vertex as starting point the other as ending point (the red numbers **1** to **6** are near the starting point of each line). Two lines will intersect somewhere unless the lines are parallel. Consider the upper right image because it has examples of each possibility. Adjacent lines intersect in one of three places: interior to the polygon (**1**-**2** and **5**-**6**), at a vertex (**2**-**3** and **4**-**5**), or outside the polygon (**3**-**4**). Our focus here is on interior intersecting angles.

Consider two general starting points ***j*** and ***j***+1. The arc on one side is 1 and the other side is ***k*** since the ending points are ***kj*** and ***k***(***j***+1) = ***kj*** + ***k***, respectively. All adjacent interior angles created in this way have the same size because all such angles are (180(***k***+1)/***n***)°. These angles are denoted by blue arcs ⌒ in the images below, all based on ***n*** = 7.

If you scrutinize *explainer* 11.4 for a while, you will recognize that the curved image is based on these adjacent angles.

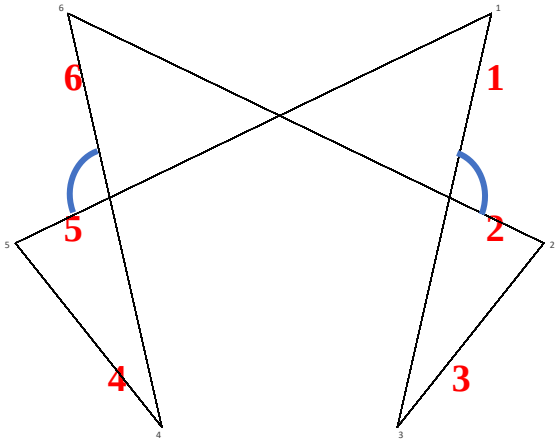
It is interesting to note that two distinct values of ***k*** produce identical looking images. This need not be the case but is based on the notion that if two lines meet at a vertex, one started there, and the other ends there.

7 n polygon vertices **2** k, Multiplier



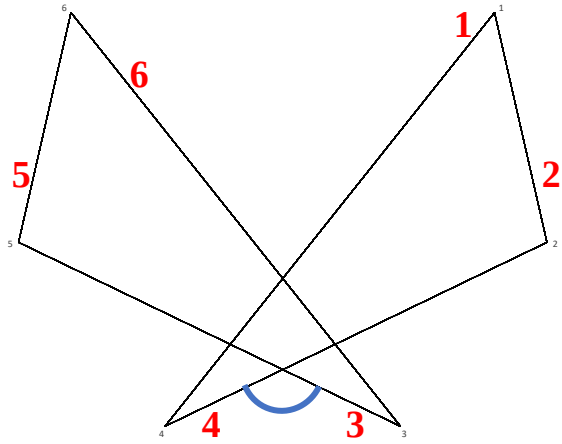
This has 3 adjacent interior angles
each one is 180·3/7° given *k* = 2

7 n polygon vertices **3** k, Multiplier



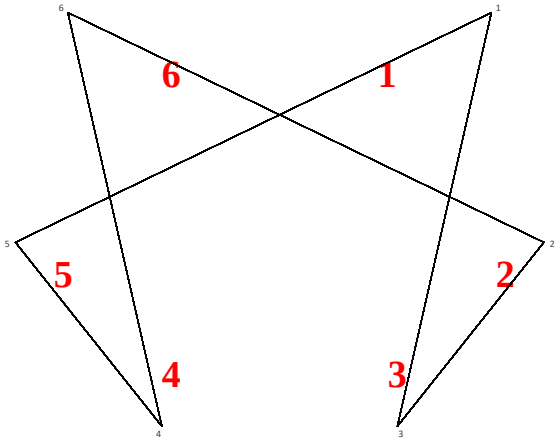
This has 2 adjacent interior angles
each one is 180·4/7° given *k* = 3

7 n polygon vertices **4** k, Multiplier



This has 1 adjacent interior angle
It is 180·5/7° given *k* = 4

7 n polygon vertices **5** k, Multiplier



This has no adjacent interior angles
***k* = 5**