Unit 4: Geometry Lesson 4.2

Coach's Corner – IV

1. Determine the number of sides a polygon has if the interior angles sum is 2700°.

$$\begin{aligned} 2700^\circ &= (n-2)180^\circ \\ 2700^\circ &= 180^\circ n - 360^\circ \\ 3060^\circ &= 180^\circ n \\ 17 &= n \end{aligned}$$

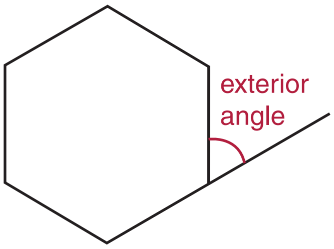
2. Explain why it is not possible to draw a regular polygon with 100° interior angles.

A regular polygon's interior angle measures and side lengths are all equal.

$$\begin{aligned} 100^\circ &= \frac{(n-2)180^\circ}{n} \\ 100^\circ &= \frac{180^\circ n - 360^\circ}{n} \\ 100^\circ n &= 180^\circ n - 360^\circ \\ -80^\circ n &= -360^\circ \\ n &= 4.5 \end{aligned}$$

The polygon would need to have 4.5 sides, which is not possible.

3. An exterior angle of a polygon is formed by extending one of the sides in the polygon.



a. Determine the exterior angle measure for a regular hexagon.

The interior angle measure for a regular hexagon is

$$\begin{aligned} \text{interior angle} &= \frac{(n-2)180^\circ}{n} \\ &= \frac{(6-2)180^\circ}{6} \\ &= 120^\circ \end{aligned}$$

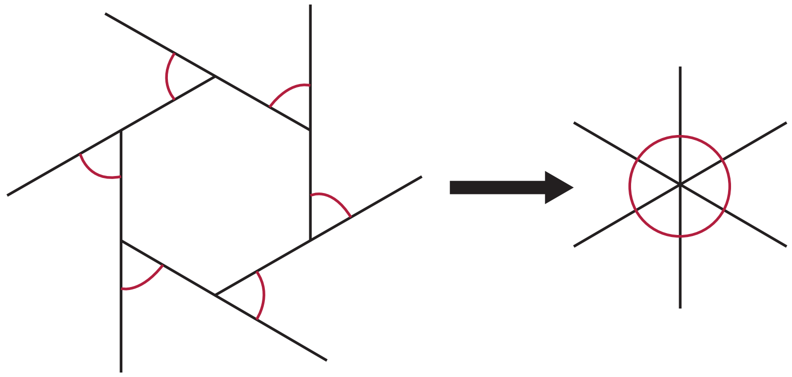
Adjacent interior and exterior angles are supplementary.

$$\begin{aligned} \text{interior} + \text{exterior} &= 180^\circ \\ 120^\circ + \text{exterior} &= 180^\circ \\ \text{exterior} &= 60^\circ \end{aligned}$$

b. If one exterior angle is drawn at each vertex, what is the exterior angles sum for a regular hexagon?

There are 6 exterior angles, so the exterior angles sum is $6 \times 60^\circ = 360^\circ$.

c. When the exterior angles for any convex polygon are placed side by side they make a complete rotation.



Explain how you could use this information to determine the exterior angle measure for regular polygon with n sides.

The exterior angles sum of a convex polygon is 360°. If a regular polygon has n sides, it will have n identical exterior angles. This means each exterior angle will measure $\frac{360^\circ}{n}$.

Please complete *Lesson 4.2 Game On!* located in *Workbook 4A* before proceeding to *Lesson 4.3*.