A. Review

A polygon is *convex* 凸 if each of its interior angles is less than a straight angle (i.e. 180°). For example, the hexagon (6) in **Fig. 13** is convex. On the other hand, when one or more of the interior angles of a polygon is reflex, i.e. greater than 180°, the polygon is *concave* 凹. For example, the pentagon (5) in **Fig. 14** is concave. We are going to discuss only convex polygons at this level.

In this chapter, the number given in brackets after the name of a polygon indicates the number of sides of the polygon.

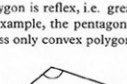


Fig. 13 Convex hexagon (6)

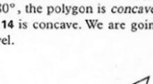


Fig. 14 Concave pentagon (5)

A polygon is *equilateral* 等邊 if all its sides are of equal length, and is *equiangular* 等角 if all its angles are equal. A *regular polygon* 正多邊形 is both equilateral and equiangular.

Note : An equilateral triangle must also be equiangular; but this is NOT true for other polygons.

e.g. **Fig. 15** shows an equilateral hexagon (6). The marked angles a and b are obviously not equal, hence the equilateral hexagon is not equiangular.

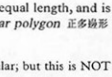
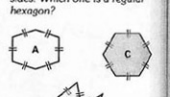


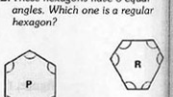
Fig. 15

Try This

1. *These hexagons have 6 equal sides. Which one is a regular hexagon?*



2. *These hexagons have 6 equal angles. Which one is a regular hexagon?*



B. Sum of Interior Angles of A Polygon

Fig. 16 shows a quadrilateral ABCD.

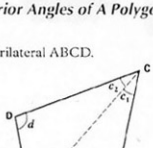


Fig. 16

If we draw a diagonal, say AC, then the diagonal divides the quadrilateral into 2 triangles, namely △ABC and △ADC. With the notation given in the figure, we have

Recall:
A line joining two nonadjacent vertices of a polygon is called a diagonal of the polygon.

$$\begin{aligned}\text{the sum of all the interior angles} &= (a_1 + a_2) + d + (c_1 + c_2) + b \\ &= (a_1 + b + c_1) + (a_2 + d + c_2) \\ &= 180° + 180° \\ &= 360°\end{aligned}$$

◀ (i) $a_1 + b + c_1 = 180°$ (∠ sum of △ABC)
(ii) $a_2 + d + c_2 = 180°$ (∠ sum of △ADC)

In fact, any quadrilateral can be divided into two triangles by a diagonal. Hence, the sum of the interior angles of a quadrilateral is the sum of the interior angles of 2 triangles, i.e. $360° (= 2 \times 180°)$.