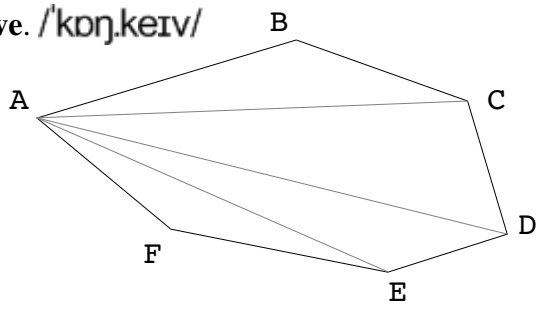
POLYGONS

Definition :	A **polygon** is a **plane** figure formed by three or more points (**vertices**), joined by line segments (**sides**).

Though a polygon may have sides intersecting one another, unless specifically stated otherwise, the term is used to denote a **closed** plane figure in which no two sides intersect : in this case, the number of sides is equal to the number of **interior angles**.

If all its interior angles are less than or equal to 180°, the polygon is **convex**.
If at least one interior angle is more than 180°, the polygon is **concave**. /ˈkɒŋ.keɪv/



This figure shows a **six-sided** polygon (a **hexagon**).
A, B, C, D, E and F are the _____ .
By drawing the _____ [AC], [AD] and [AE] from the _____ A, this polygon can be divided into _____ triangles.
As the interior angle sum of each triangle is 180°,
the interior angle sum of this hexagon is **180°** × _____ = _____°

Exercises

1. *Find the interior angle sum of : a quadrilateral ; a **pentagon** ; an **octagon**.*
2. *How many sides has a convex polygon with an interior angle sum of : 1, 620° ; 2, 340°.*
3. *A pentagon has one angle of 116°. What is the size of each other angle if they are equal to each other?*
4. *Two angles of a quadrilateral are 80° and 40°. Find the other two angles if one is twice the other.*
5. *Find the angles of a triangle in which two angles are equal and the third is 15° greater.*

A polygon that has all its sides equal is an **equilateral** polygon. **/ˌiː.kwɪˈlæt.ər.əl/**
(A polygon that has all its interior angles equal is an equiangular polygon.)

REGULAR POLYGONS : All the sides and all the interior angles are equal.

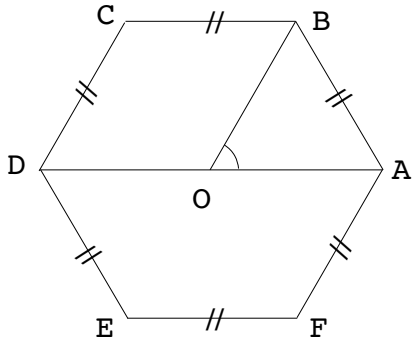
A regular /ˈreg.jʊ.lər/ polygon is both equilateral and equiangular. **/ˌiː.kwɪˈæŋ.gjʊ.lər /**

Exercises

6. *What is a regular triangle called? How big is each angle?*
7. *Same questions for a regular quadrilateral.*
8. *Copy and complete the following table for regular polygons:*

number of sides	*name*	*interior angle sum*	*Size of one interior angle*
3		180°	**180 ÷ 3 = 60°**
4			
5			
6	*regular hexagon*		

9. *All regular polygons **fit** exactly into a circle.*
   For the regular hexagon drawn in this figure,
   *each **angle at the centre** is* **360 ÷** _____ = _____



Calculate the size of the angle at the center of the following regular polygons and draw them:

a) a pentagon
b) an octagon
*c) a **decagon***

Vocabulary : angle at the center – closed (figure) – concave – convex – decagon – equilateral (polygon) – to fit (into ...) – hexagon – interior angle – ***n***-sided (polygon) – octagon – pentagon – plane – polygon – regular (polygon) – side – vertex (*vertices*)