Definition of angles

▶角

有共同端點的兩射線（或線段）可形成一個角。如右圖，

$\overleftrightarrow{AB}$ 與 $\overrightarrow{AC}$ 所形成的角，可記為∠A，也可記為∠BAC 或

∠CAB。
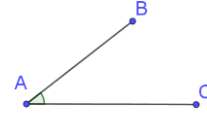
英文參考

What is an angle?

An angle is a form of geometrical shape, that is constructed by joining two rays to each other at their end-points.

The angle can also be represented by three letters with the middle letter indicating where the angle actually is (i.e. its vertex).

For example, an angle formed by $\overrightarrow{AB}$ and $\overrightarrow{AC}$ can be represented as ∠A.

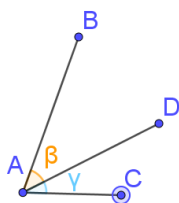It can also be represented as ∠BAC or ∠CAB.

∠A 也可表示該角的度數，例如：∠A 的度數為 100°，可記為∠A＝100°。

英文參考

∠A can also represent the degree of the angle.

For example: ∠A has a degree of 100°, which can be denoted as ∠A = 100°.

(國外課本通常會加上 the measure of ∠A 以 m∠A＝100°來表示)

如右圖，如果以∠A 表示無法確定是哪一個角，則必須使用三個點表示其中的角，例如：∠CAD、∠DAB 或∠CAB。為了方便起見，也可在圖上標出「β」和「γ」，即可用∠γ 表示∠CAD，∠β 表示∠DAB。

英文參考

If the notation ∠A cannot clarify the angle, three letters must be used to represent the angle.

For example: ∠CAD, ∠DAB, or ∠CAB.

You can also mark "β" and "γ" on the diagram.

Let ∠γ represent as ∠CAD and ∠βrepresent as ∠DAB.

若∠A、∠B 是兩個已知角，則∠A 與∠B 的大小關係如下：
(1) ∠A 的度數比∠B 的度數大，記為∠A＞∠B；
(2) ∠A 的度數比∠B 的度數小，記為∠A＜∠B；
(3) ∠A 的度數與∠B 的度數相等，記為∠A＝∠B。

英文參考

If ∠A and ∠B are two known angles, then the relation between ∠A and ∠B is as follows:

(1) The measure of ∠A is greater than the measure of ∠B.
    It is denoted as ∠A＞∠B.

(2) The measure of ∠A is less than the measure of ∠B.
    It is denoted ∠A＜∠B.
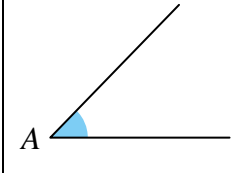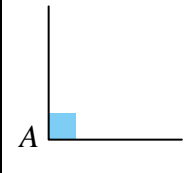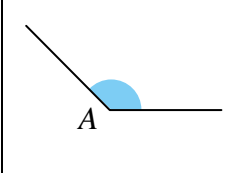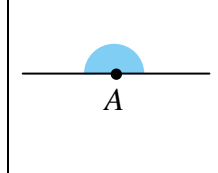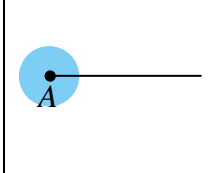
(3) The measure of ∠A is equal to the measure of ∠B
    It is denoted as ∠A＝∠B.

補充：

Types of Angles

銳角	直角	鈍角	平角	周角
$0° < \angle A < 90°$	$\angle A = 90°$	$90° < \angle A < 180°$	$\angle A = 180°$	$\angle A = 360°$

There are majorly six types of angles in Geometry.

The names of all angles with their properties are:
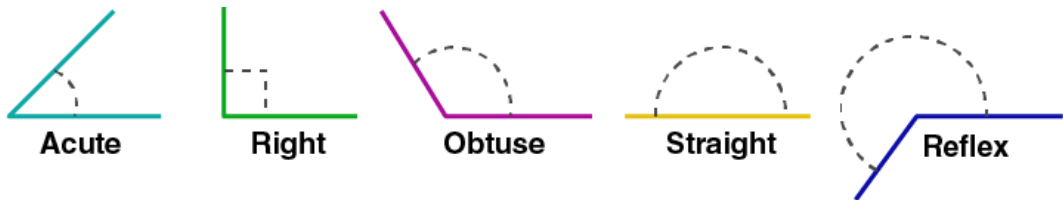
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- 銳角 Acute Angle: An angle with a measurement that is between 0° to 90°.
- 直角 Right Angle: An angle with a measurement that is is exactly equal to 90°.
- 鈍角 Obtuse Angle: An angle with a measurement that is between 90° to 180°.
- 平角 Straight Angle: The angle measurement is exactly equal to 180°.
- 優角 Reflex Angle: An angle with a measurement that is is greater than 180° and less than 360°.
- 周角 Full Rotation: The complete rotation of the angle is equal to 360°

互餘

若兩角之和為 90°，則稱這兩個角互為餘角。若兩個角互為餘角，則可以說其中一個角是另一個角的餘角。

If the sum of two angles is 90°, then they are called complementary angles.

互補

若兩角之和為 180°，則稱這兩個角互為補角。若兩個角互為補角，則可以說其中一個角是另一個角的補角。

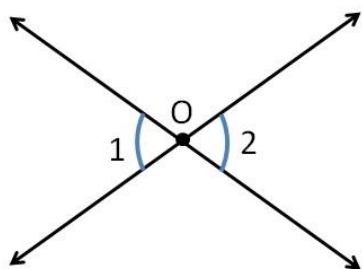If the sum of two angles is 180°, then they are called supplementary angles.

補充：對頂角、同位角、內錯角、同側內角

對頂角 Vertical Angles

Vertical Angles are the angles opposite each other when two lines cross.
Example: ∠1 and ∠2 are vertical angles.
The interesting thing here is that **vertical angles are equal**:∠**1** = ∠**2**
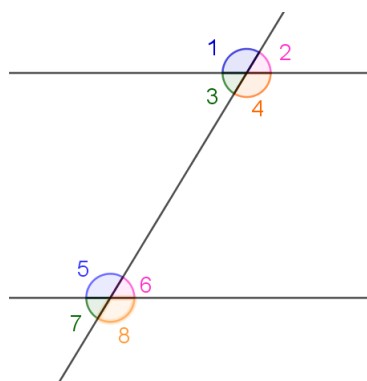

同位角 Corresponding Angles

When two lines are crossed by another line (called the Transversal):

The angles in matching corners are called **Corresponding Angles**.

In this example, these are corresponding angles:

- ∠1 and ∠5
- ∠2 and ∠6
- ∠3 and ∠7
- ∠4 and ∠8

內錯角 Alternate Interior Angles

Alternate Interior Angles are a pair of angles on the inner side of each of those two lines but on opposite sides of the transversal. In this example, these are two pairs of Alternate Interior Angles:

- $\angle 3$ and $\angle 6$
- $\angle 4$ and $\angle 5$

同側內角 Consecutive Interior Angles

The pairs of angles on the same side of the transversal but inside the two lines are called Consecutive Interior Angles.

In this example, these are Consecutive Interior Angles:

- $\angle 3$ and $\angle 5$
- $\angle 4$ and $\angle 6$

The consecutive interior angles theorem states that when the two lines are parallel, then the consecutive interior angles are supplementary(互補的) to each other.

補充：內角、外角

Interior and Exterior Angles (內角和外角)

In case of a polygon, such as a triangle, quadrilateral, pentagon, hexagon, etc., we have both interior and exterior angles.

- 內角 Interior angles are those that lie inside the polygon or a closed shape having sides and angles.
- 外角 Exterior angles are formed outside the shape, between any side and line extended from adjacent sides.

For example, an image of a pentagon is given here, representing its interior angles and exterior angles.
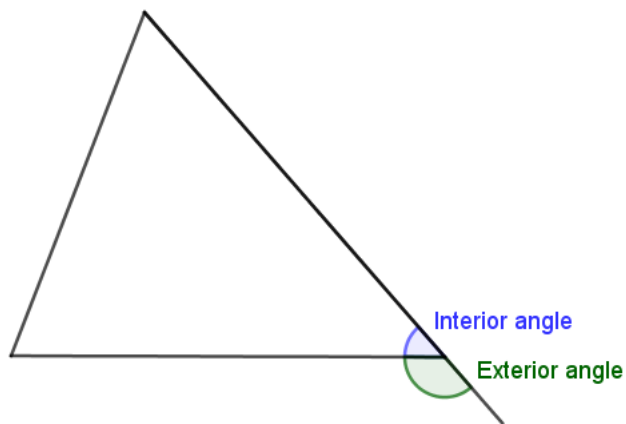
參考資料來源

1. 110 國中數學翰林版課本

2. Angles (Definition, Types, Properties, Degrees, Examples) (byjus.com)

3. Transversals (mathsisfun.com)

☆老師們可以自己從中選擇以做出適合自己學生程度的學習單或是在課堂中適時補充這些英文。

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