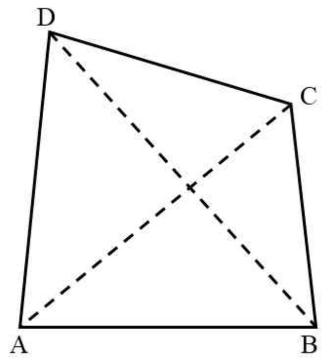
MATHEMATICS

CLASS NOTES FOR CBSE

Chapter 08. Quadrilaterals

01. Quadrilateral

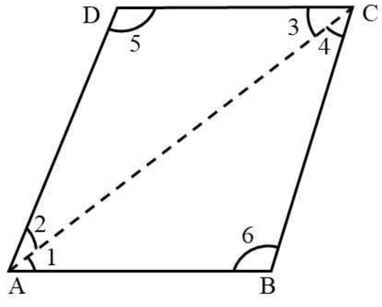
The word 'quad' means four and the word 'lateral' means sides. Thus, a plane figure bounded by four line segments AB, BC, CD and DA is called a quadrilateral and is written as quad. $ABCD$ or, $\square ABCD$. The points A, B, C, D are called its vertices. The four line segments, AB, BC, CD, and DA are the four sides. and the four angles $\angle A$, $\angle B$, $\angle C$ and $\angle D$ are the four angles of quad. $ABCD$. Two line segments AC and BD are called the diagonals of quad. $ABCD$.



Figure

02. Angle Sum Property of a Quadrilateral

<u>**Result**</u> *The sum of the four angles of a quadrilateral is 360°.*
Given : Quadrilateral $ABCD$
To Prove : $\angle A + \angle B + \angle C + \angle D = 360°$
Construction : Join AC



Figure

Proof : In ΔABC, we have

$$\angle 1 + \angle 4 + \angle 6 = 180° \quad ...(i)$$

In ΔACD, we have

$$\angle 2 + \angle 3 + \angle 5 = 180° \quad ...(i)$$

Adding (i) and (ii), we get

$$(\angle 1 + \angle 2) + (\angle 3 + \angle 4) + \angle 5 + \angle 6 = 180° + 180°$$

$\Rightarrow$ $\angle A + \angle C + \angle D + \angle B = 360°$

$\Rightarrow$ $\angle A + \angle B + \angle C + \angle D = 360°$

03. Properties of a Parallelogram

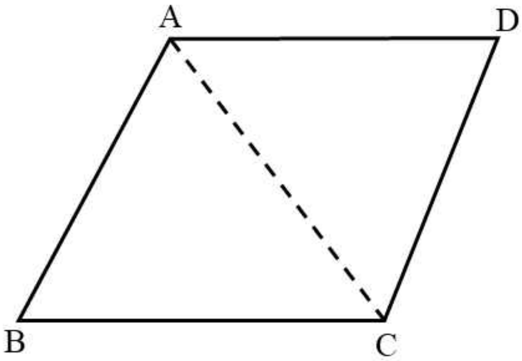
<u>**Result**</u> *A diagonal of parallelogram divides it into two congruent triangles.*

Given : A parallelogram $ABCD$.

To Prove : A diagonal, say, AC, of parallelogram $ABCD$ divides it into congruent triangles ABC and CDA i.e.

$\Delta ABC \cong \Delta CDA$

Construction : Join AC.



Figure

Proof : Since $ABCD$ is a parallelogram. Therefore,

$AB \parallel DC$ and $AD \parallel BC$

Now, $AD \parallel BC$ and transversal AC intersects them at A and C respectively.

$\therefore$ $\angle DAC = \angle BCA$ [Alternate interior angles] ...(i)

Again, $AB \| DC$ and trasversal AC intersects them at A and C respectively. Therefore,

$\angle BAC = \angle DCA$ [Alternate interior angles] ...(ii)

Now, in Δs ABC and CDA, we have

$\angle BCA = \angle DAC$ [From (i)]

$AC = AC$ [Common side]

$\angle BAC = \angle DCA$ [From (i)]

So, by ASA congruence criterion, we obtain

$\Delta ABC \cong \Delta CDA$