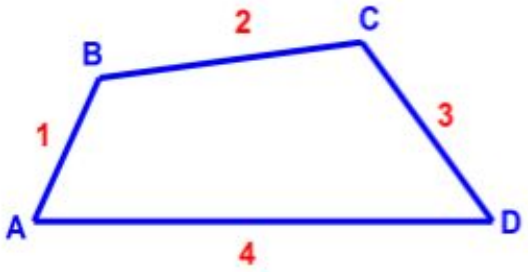
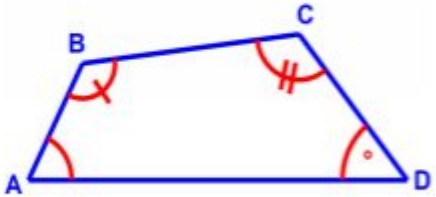
Important Quadrilaterals

What is a Quadrilateral?

First, it is important to note that all quadrilaterals have **4 sides**.



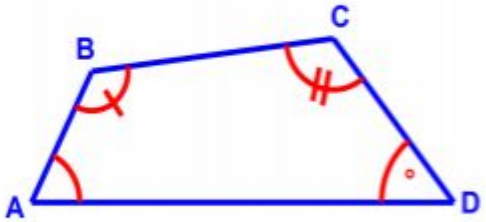
Also, the four interior angles of a quadrilateral always add up to 360°



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

Convex Quadrilateral

A **convex quadrilateral** always has all four interior angles measuring **less than** 180°. A convex quadrilateral looks like this:

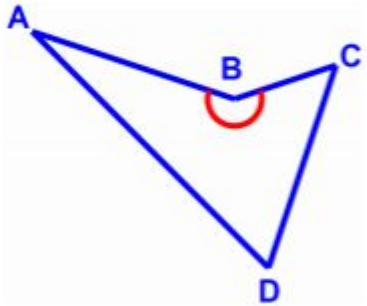


$\angle A < 180°$ $\angle C < 180°$

$\angle B < 180°$ $\angle D < 180°$

Concave Quadrilateral

A concave quadrilateral has one angle that measures more than 180°. A concave quadrilateral looks like this:



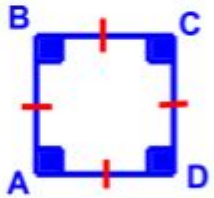
$\angle B > 180°$

Square

The first special quadrilateral that we will look at is the **square**.

All **squares** have

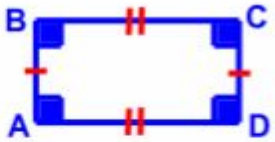
- 4 congruent (equal in length) sides
- 4 congruent angles (all of the interior angles measure 90°)



$$\angle A = \angle B = \angle C = \angle D = 90°$$

$$m\overline{AB} = m\overline{BC} = m\overline{CD} = m\overline{AD}$$

Rectangle

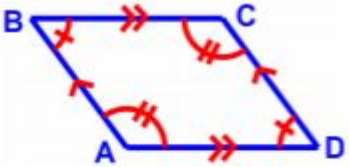


All **rectangles** have

- 4 congruent interior angles (90°)
- congruent opposing sides

$m\overline{AB} = m\overline{CD}$ and $m\overline{BC} = m\overline{AD}$

Rhombus



All **rhombus'** have

- parallel opposing sides

$$\overline{AB} \parallel \overline{CD} \text{ and } \overline{BC} \parallel \overline{AD}$$

- 4 congruent sides

$$m\overline{AB} = m\overline{BC} = m\overline{CD} = m\overline{AD}$$

- opposing angles that are equal

$$\angle A = \angle C \text{ and } \angle B = \angle D$$

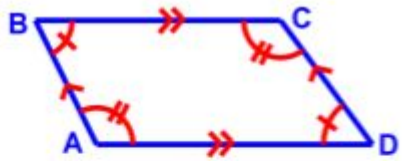
- two pairs of supplementary angles

$$\angle A + \angle B = 180° \text{ and } \angle C + \angle D = 180°$$

or

$$\angle A + \angle D = 180° \text{ and } \angle B + \angle C = 180°$$

Parallelogram



All **parallelograms** have

- parallel opposing sides

$$\overline{AB} \parallel \overline{CD} \text{ and } \overline{BC} \parallel \overline{AD}$$

- congruent sides

$$m\overline{AB} = m\overline{CD} \text{ and } m\overline{BC} = m\overline{AD}$$

- opposing angles that are equal

$$\angle A = \angle C \text{ and } \angle B = \angle D$$

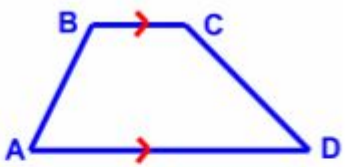
- two pairs of supplementary angles

$$\angle A + \angle B = 180° \text{ and } \angle C + \angle D = 180°$$

or

$$\angle A + \angle D = 180° \text{ and } \angle B + \angle C = 180°$$

Trapezoid



All **trapezoids** have

- one pair of parallel opposing sides

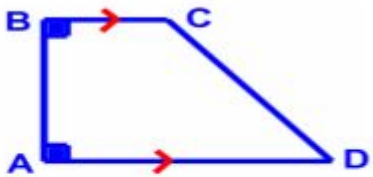
$$\overline{BC} \parallel \overline{AD}$$

- one pair of supplementary angles

$\angle A + \angle B = 180°$ and $\angle C + \angle D = 180°$

Right Trapezoid

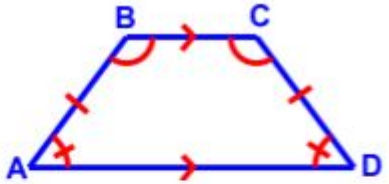
The **right trapezoid** looks like this:



The right trapezoid has all the same characteristics as other trapezoids, but in addition to those it has two interior angles that measures 90°.

$\angle A = 90°$ and $\angle B = 90°$

Isosceles Trapezoid



The **isosceles trapezoid** has the following characteristics:

- one pair of parallel opposing sides

$$\overline{BC} \parallel \overline{AD}$$

- one pair of congruent opposing sides

$$m\overline{AB} = m\overline{CD}$$

- two pairs of congruent angles

$$\angle A = \angle D \text{ and } \angle B = \angle C$$

- Also,

$$\angle A + \angle B = 180° \text{ and } \angle C + \angle D = 180°$$

or

$$\angle A + \angle C = 180° \text{ and } \angle B + \angle D = 180°$$