Convex and Concave Quadrilaterals

1. Convex Quadrilateral:

A quadrilateral is convex if all its interior angles are less than 180°, and no part of the shape is "pushed inward".

Characteristics:

- All interior angles < 180°.

- Diagonals lie inside the shape.

- No line segment between any two points inside the figure goes outside the figure.

Common Examples: Square, Rectangle, Rhombus, Parallelogram, Trapezium

2. Concave Quadrilateral:

A quadrilateral is concave if at least one of its interior angles is greater than 180°, and one vertex seems to be pushed inward.

### Characteristics:

- One angle is > 180°

- One of the diagonals lies outside the figure

- Shape looks "caved in" at one vertex

Example: An arrowhead-like shape

Properties of Convex and Concave Quadrilaterals:

Property	Convex Quadrilateral	Concave Quadrilateral
Interior angles	All < 180°	One angle > 180°
Diagonals	Both lie inside the shape	One lies outside
Shape	Looks regular or balanced	Has an inward corner
Common examples	Square, Rhombus, Trapezium	Arrowhead-like figures
Sum of interior angles	Always 360°	Always 360°
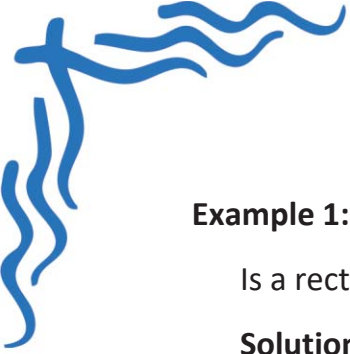
Example 1:

Is a rectangle a convex or concave quadrilateral?

Solution:

A rectangle has four right angles, each measuring 90°.

Since all interior angles are less than 180°, and both diagonals lie inside the figure, it is a convex quadrilateral.

Answer: Convex quadrilateral

Example 2:

A quadrilateral has one of its angles as 210°. Is it convex or concave?

Solution:

If one of the angles is greater than 180°, then by definition, the quadrilateral is concave.

Answer: Concave quadrilateral

Summary Points:

- **Convex quadrilateral:** All angles < 180°, diagonals inside, regular shape.
- **Concave quadrilateral**: One angle > 180°, diagonals may lie outside.
- Sum of all interior angles is always 360° for both types.
- Common convex shapes include square, rectangle, and trapezium.
- Concave shapes look like they are "bent inward" at one corner.