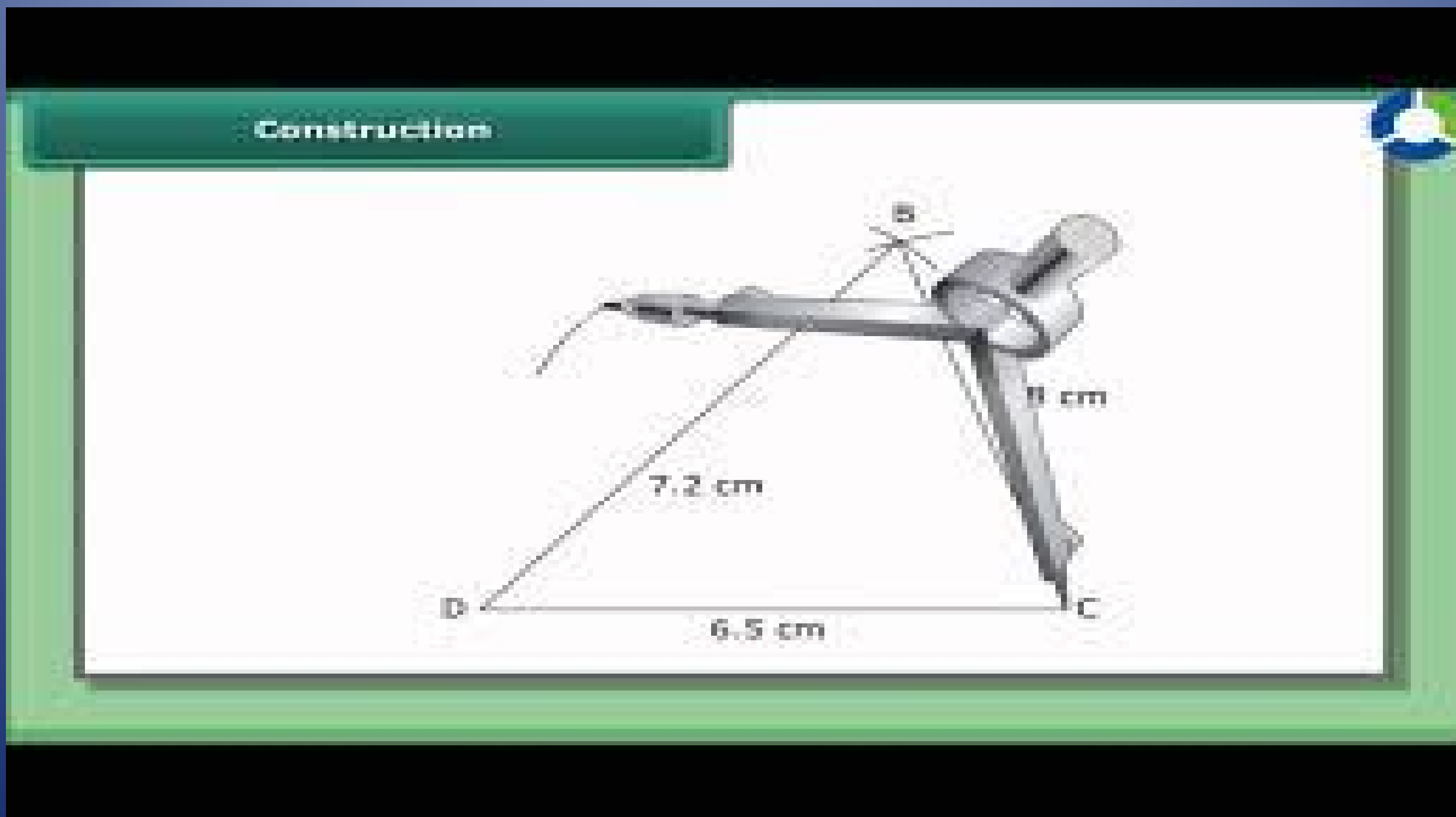
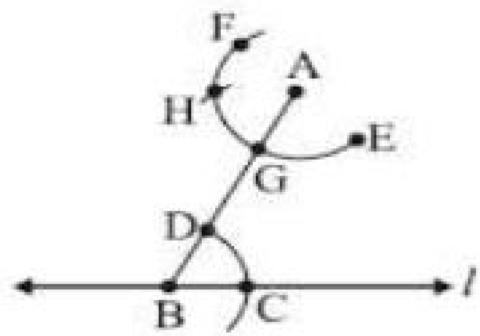
PRACTICAL GEOMETRY
CLASS-8



INTRODUCTION

Geometry is a branch of mathematics concerned with questions of shape, size, relative position of figures, and the properties of space. The word geometry came from the Ancient Greek word : γεωμετρία (geometron) .Where *geo- means* “earth” and *-Metron means* “measurement”.



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OBJECTIVES

At the end of this lesson, students will be able to:

- Define the term quadrilateral
- State the different types of quadrilaterals
- Differentiate between the different types of quadrilaterals
- Apply basic construction techniques to construct at least two types of quadrilaterals
- Demonstrate the correct techniques for constructing at least two types of quadrilaterals
- Value the use of quadrilaterals

CONSTRUCTING A QUADRILATERAL

We shall learn how to construct a unique quadrilateral given the following measurements:

- When four sides and one diagonal are given.
- When two diagonals and three sides are given.
- When two adjacent sides and three angles are given.
- When three sides and two included angles are given.
- When other special properties are known.

1. WHEN THE LENGTHS OF FOUR SIDES AND A DIAGONAL ARE GIVEN.

We shall explain this construction through an example.

- Construct a quadrilateral PQRS where PQ = 4cm ,QR = 6 cm, RS = 5 cm, PS = 5.5 cm and PR = 7 cm.

Draw a rough sketch of the quadrilateral.

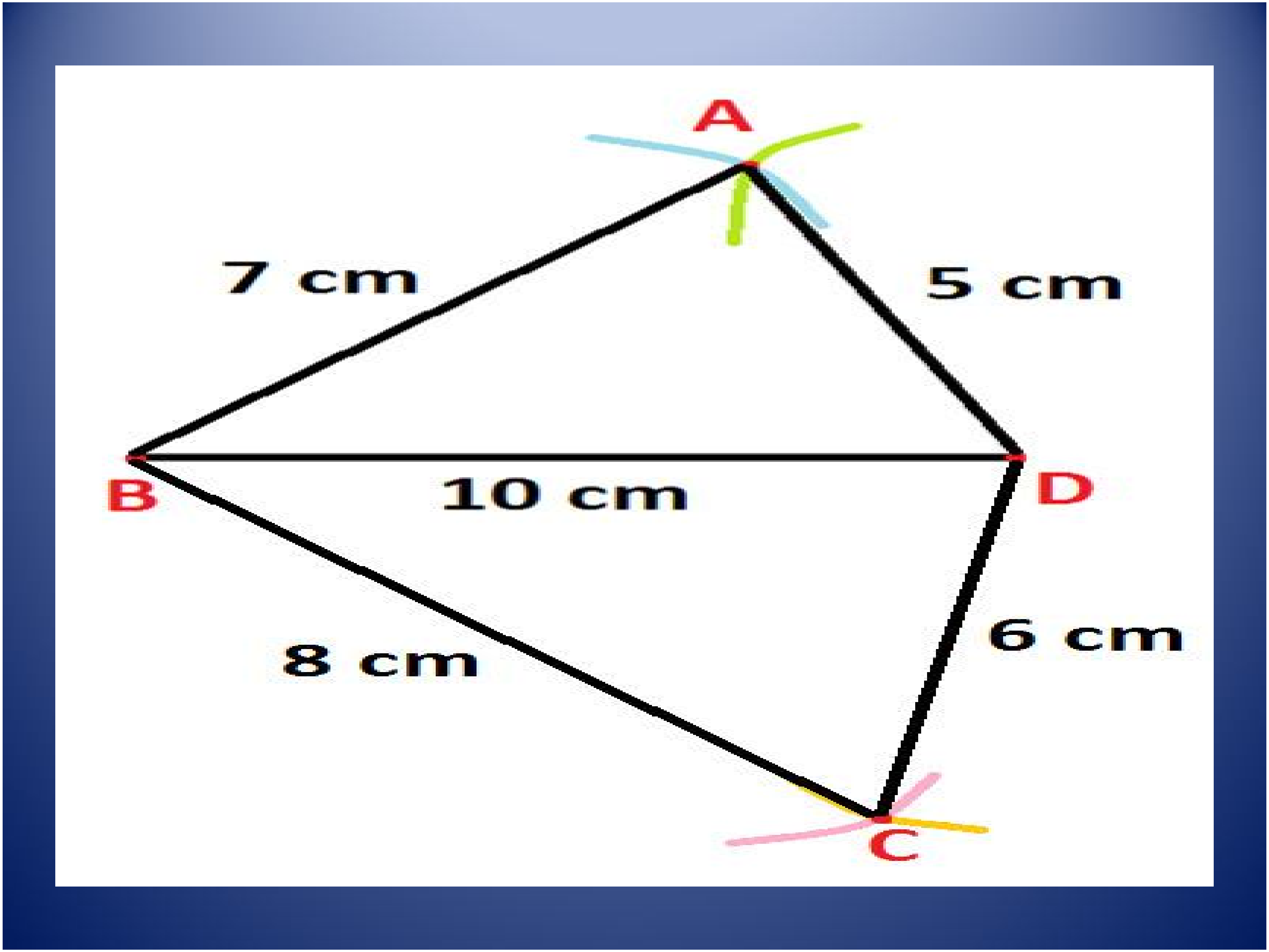
Step 1 : From the rough sketch, it is easy to see that ΔPQR can be constructed using SSS construction condition. Draw ΔPQR.

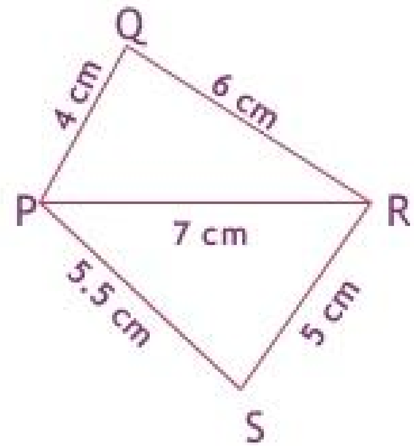
Step 2 : Now, we have to locate the fourth point S. This 'S' would be on the side opposite to Q with reference to PR. For that, we have two measurements. S is 5.5 cm away from P. So, with P as centre, draw an arc of radius 5.5 cm. (The point S is somewhere on this arc!).

Step 3 : S is 5 cm away from R. So with R as centre, draw an arc of radius 5 cm.

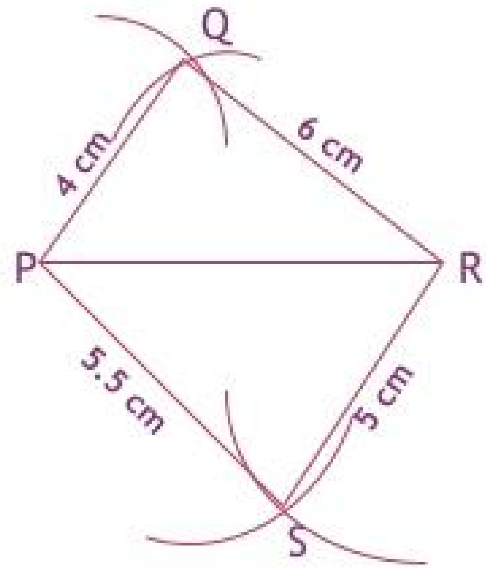
Step 4 : S should lie on both the arcs drawn. So it is the point of intersection of the two arcs. Mark S and complete PQRS.

" PQRS is the required quadrilateral ".


A
7 cm
5 cm
B
10 cm
D
8 cm
6 cm
C



Rough Sketch



Real Figure

2. WHEN TWO DIAGONALS AND THREE SIDES ARE GIVEN .

We shall explain this construction through an example.

- Construct a quadrilateral ABCD, given that BC = 4.5 cm, AD = 5.5 cm, CD = 5 cm the diagonal AC = 5.5 cm and diagonal BD = 7 cm.

Draw a rough sketch of the quadrilateral.

Step 1 : Draw Δ ACD using SSS construction. (We now need to find B at a distance of 4.5 cm from C and 7 cm from D).

Step 2 : With D as centre, draw an arc of radius 7 cm. (B is somewhere on this arc).

Step 3 : With C as centre, draw an arc of radius 4.5 cm (B is somewhere on this arc also).

Step 4 : Since B lies on both the arcs, B is the point intersection of the two arcs. Mark B and complete ABCD. ABCD is the required quadrilateral

3. WHEN TWO ADJACENT SIDES AND THREE ANGLES ARE KNOWN.

We shall explain this construction through an example.

- Construct a quadrilateral MIST where MI = 3.5 cm, IS = 6.5 cm, $\angle M = 75^\circ$, $\angle I = 105^\circ$ and $\angle S = 120^\circ$.

Draw a rough sketch of the quadrilateral.

Step 1 How do you locate the points? What choice do you make for the base and what is the first step?

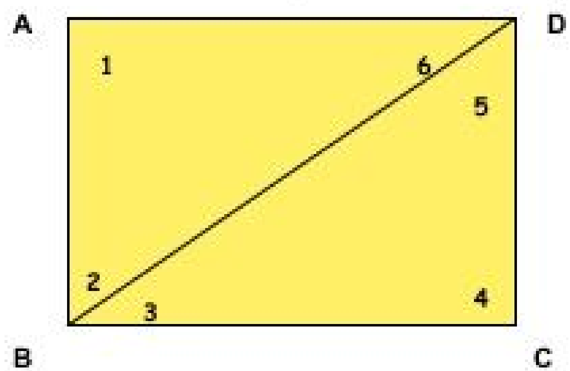
Step 2 Make $\angle ISY = 120^\circ$ at S.

Step 3 Make $\angle IMZ = 75^\circ$ at M. (where will SY and MZ meet?) Mark that point as T.

"We get the required quadrilateral MIST."

Angle Sum Property Of Quadrilateral

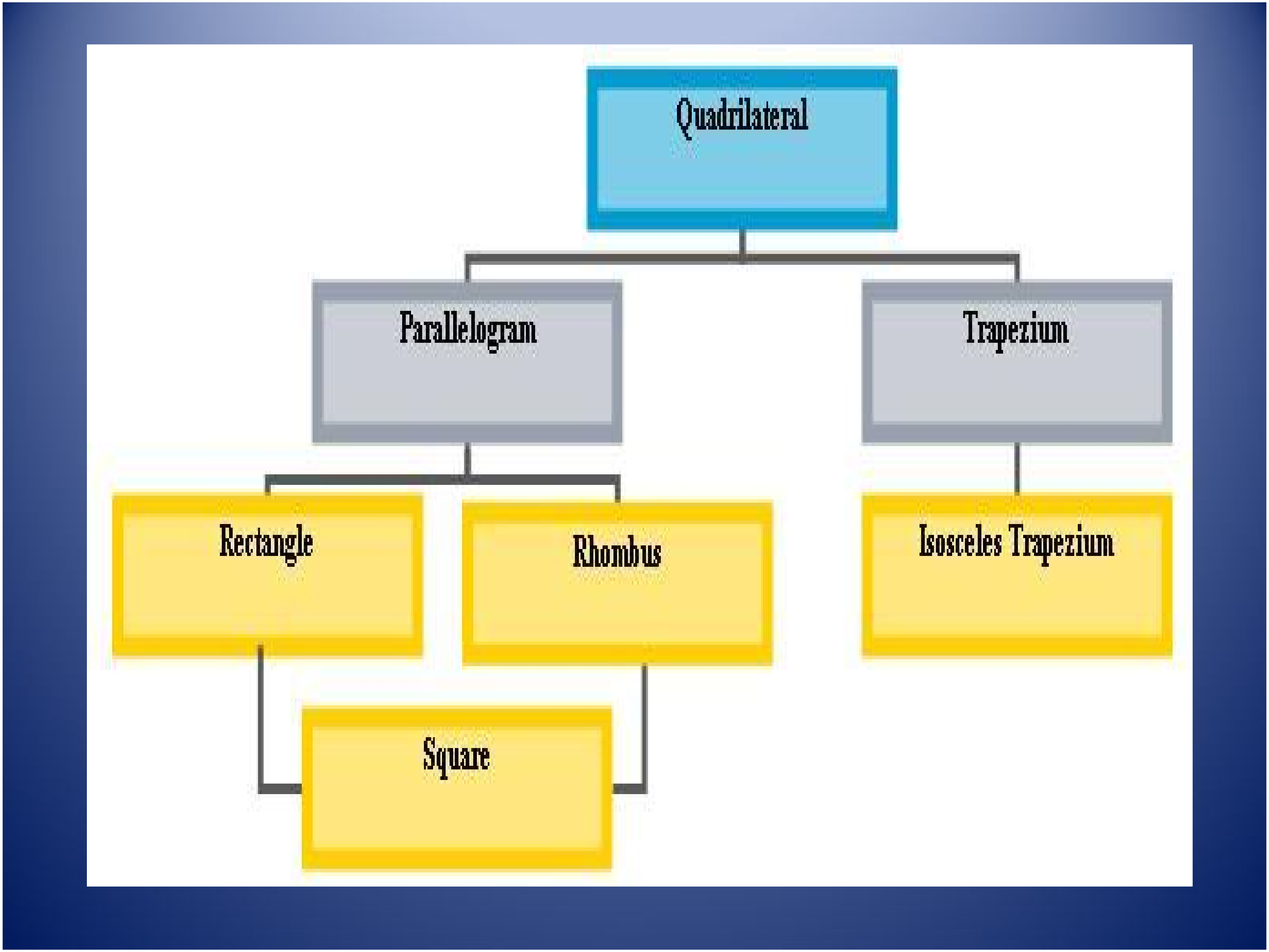
The sum of all four angles of a quadrilateral is 360°.



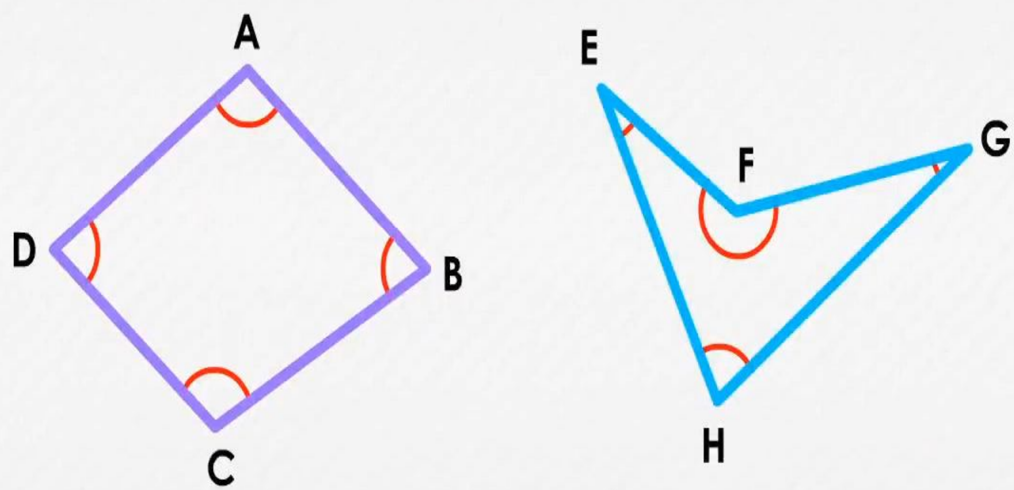
Given: ABCD is a quadrilateral

To Prove: Angle (A+B+C+D) $=360^\circ$

Construction: Join diagonal BD


Quadrilateral
Parallelogram
Trapezium
Rectangle
Rhombus
Isosceles Trapezium
Square

Interior angles of all simple quadrilateral (convex or concave) add up to 360°.



$\angle A + \angle B + \angle C + \angle D = 360°$ $\angle E + \angle F + \angle G + \angle H = 360°$