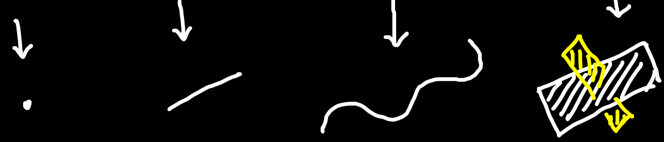
Part 1

Polygons (the new notes)

What is a figure?

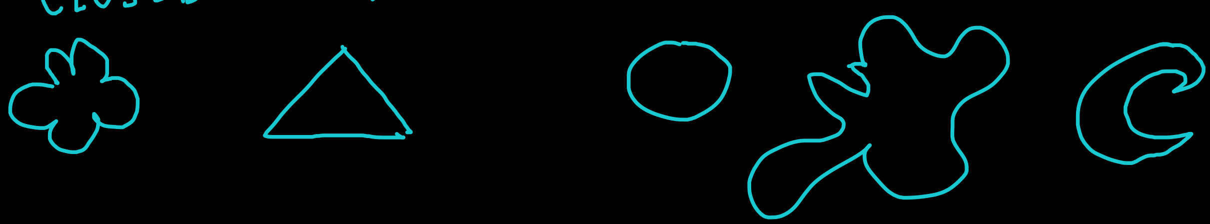
→ A geometric form consisting of point, lines, curved lines & planes

ignore pls.

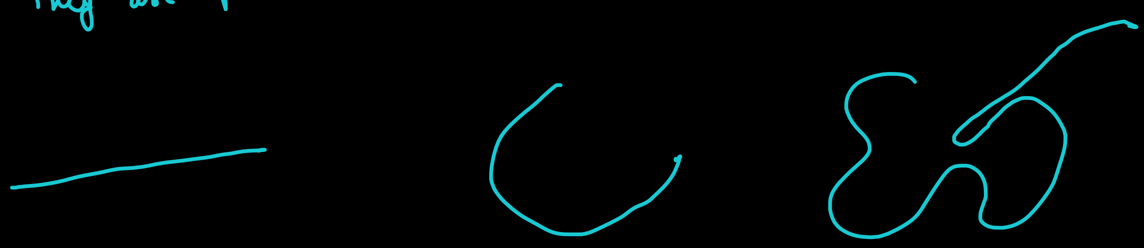


Types of figure :

- CLOSED :- They are closed



- OPEN :- They are open



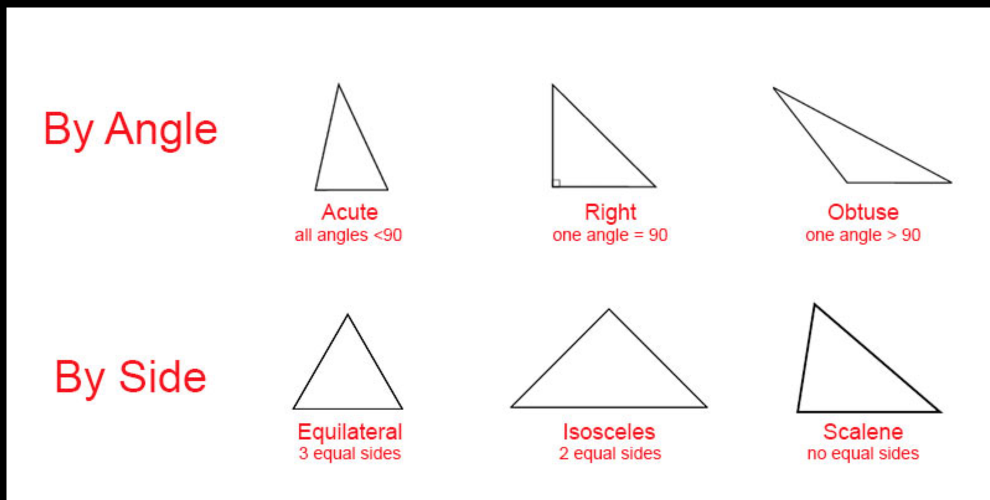
POLYGONS :-

- Closed figure with straight edges

  (circle is not a polygon)

Types of Polygons :-

- Triangle

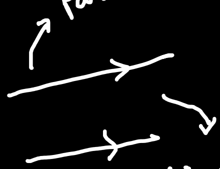


- Quadrilateral

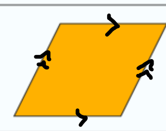
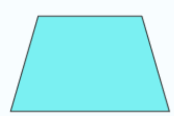
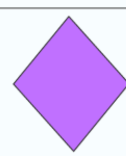
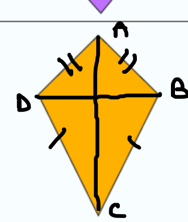
Types of Quadrilaterals

cuemath

parallel lines



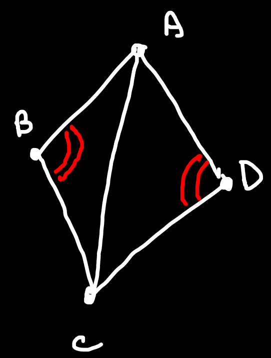
lines which never intersect

Quadrilateral	Shape	
Square		→ All sides equal and all angles = 90°
Rectangle		→ Opposite sides equal and parallel and all angles = 90°
Parallelogram		Opposite sides equal and parallel
Trapezium		→ One pair of sides parallel
Rhombus		→ all sides equal, diagonals are perpendicular to each other
Kite		→ AB = AD , BC = DC

Q. In a rhombus, opposite angles are equal

(same way for parallelogram)

→



In △ABC, △ADC

AB = AD
BC = DC [rhombus has all 4 sides equal]
AC = AC

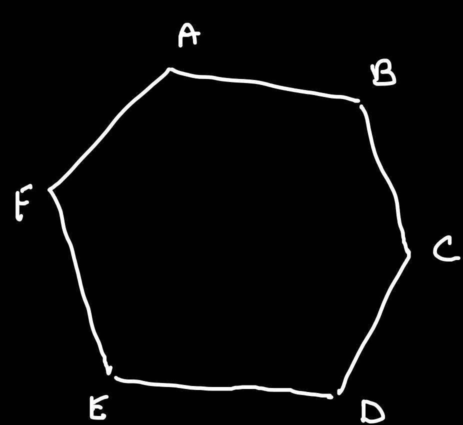
Hence by SSS congruency,

△ABC ≅ △ADC

⇒ ∠ABC = ∠ADC

Similarly ∠BAD = ∠BCD

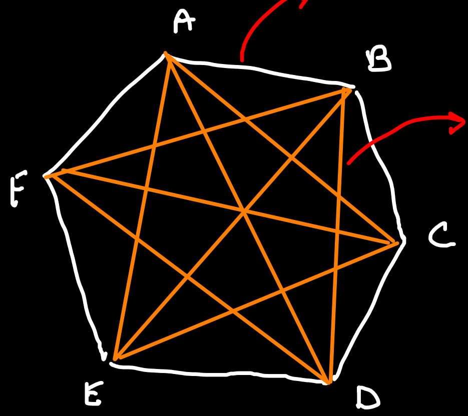
Adjacent sides
Any two sides with a common end point are called the adjacent sides of the polygon.
Adjacent vertices
The end points of the same side of a polygon are called the adjacent vertices.
Diagonals
The line segments obtained by joining vertices which are not adjacent are called the diagonals of a polygon.
Concave polygon:
If a diagonal lies outside a polygon, then the polygon is called a concave polygon.
Convex polygon:
If all the diagonals lie inside the polygon, then the polygon is said to be a convex polygon.



- A, B are adjacent vertices (side AB)
- A, D are not adject

↳ AB, BC are adjacent

↳ ED, BC are not adjacent

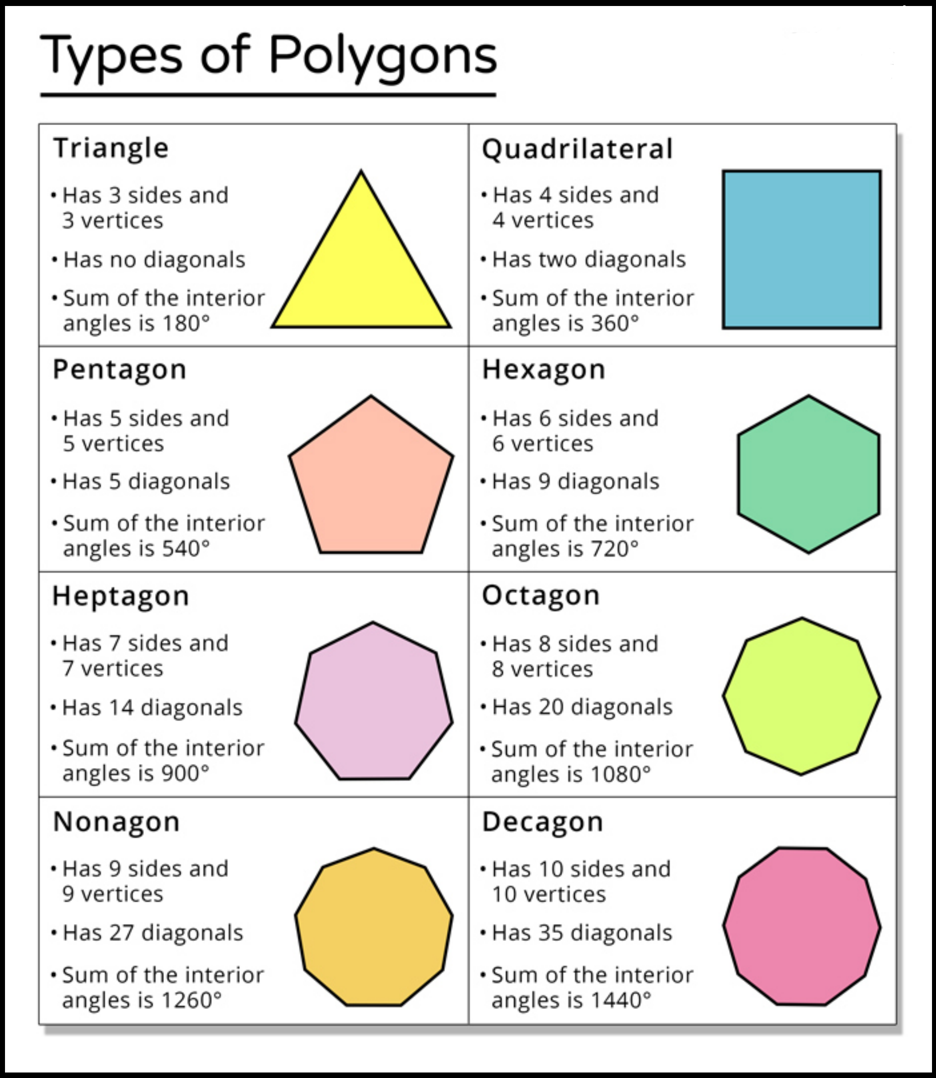


AB is a side

BD is a diagonal

AC	BD	CE	DF
AD	BE	CF	
AE	BF		

→ 9 diagonals



n-gon for $n \geq 12$.

No of diagonals in n-gon:

$$\text{No of diagonals in } n\text{-gon} = \frac{n(n-3)}{2}$$

Proof:-

- Now we can choose a vertex in n different ways (n vertices)
- each vertex is endpoint of $n-3$ diagonals (Why? Try a few examples)
- So the number of diagonals $= n(n-3)$
- However every diagonal is counted 2 time So we must divide by 2. (why?)

  ↳ because

  any diagonal has 2 endpoints
- Hence $\boxed{\frac{n(n-3)}{2}}$

P.S. Try verifying for a few values

(we verified in the class)