CHAPTER:-3

# Understanding   Quadrilaterals (Part 2)

GUIDELINES

 Dear students, kindly refer to the following notes/video links for the Chapter- **" UNDERSTANDING QUADRILATERALS "(PART 2)**. Thereafter attempt the given questions in your Mathematics notebook.

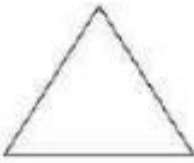**NOTE-** Students can download the NCERT textbook using the following link:
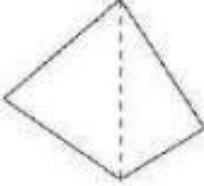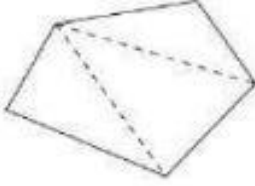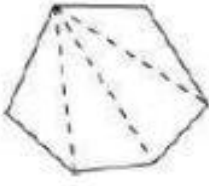
INTRODUCTION

In a polygon there are interior angles and exterior angles.
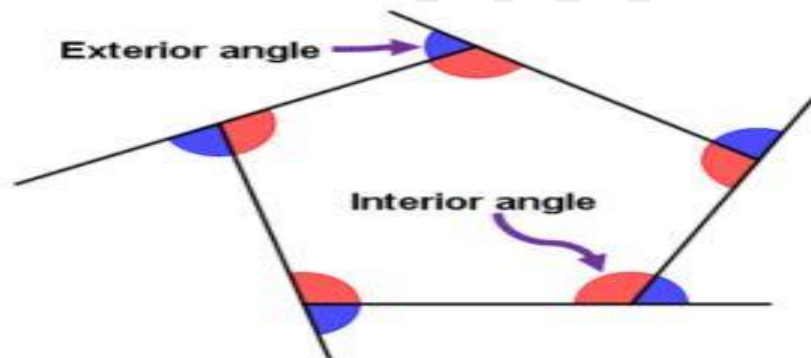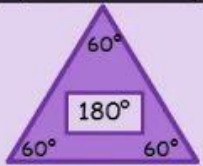

Interior Angle Sum Property
The sum of all angles of a triangle is 180 º. We now extend this idea to other polygons .

Figure				
Side	3	4	5	6
Angle sum	180°	$2 \times 180°$ $= (4 - 2) \times 180°$	$3 \times 180°$ $= (5 - 2) \times 180°$	$4 \times 180°$ $= (6 - 2) \times 180°$

Interior angles in regular polygons
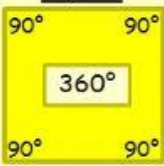
If a shape is regular, all of its angles are the same size.

Equilateral Triangle

60°
180°
60°   60°

Total = 180°
One angle = 180 ÷ 3
= 60°

Square

90°   90°
360°
90°   90°

Total = 360°
One angle = 360 ÷ 4
= 90°

Regular Pentagon

108°
108°   108°
540°
108°   108°

Total = 540°
One angle = 540 ÷ 5
= 108°

Regular Hexagon

720°

Total = 720°
One angle = 720 ÷ 6
= 120°

Regular Heptagon

900°

Total = 900°
One angle = 900 ÷ 7
= 128.5...°

Regular Octagon

1080°

Total = 1080°
One angle = 1080 ÷ 8
= 135°

If the polygon has **n** **sides**, the angle sum is $(n - 2) \times 180$.

Divide this answer by **n** to get the size of one angle.

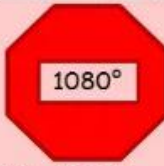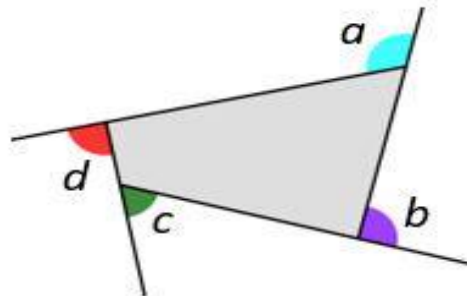$$\frac{180(n - 2)}{n}$$

Exterior Angles

The sum of the exterior angles of any polygon is 360°.

The exterior angle of a regular n-sided polygon is $\dfrac{360°}{n}$
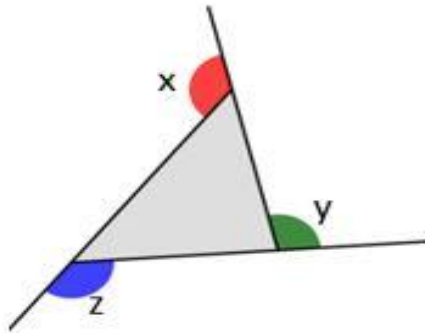
$x + y + z = 360°$

$a + b + c + d = 360°$

SUBTOPICS

1. Angle sum property
2. Sum of exterior angles of a polygon
3. Number of sides of a regular polygon

KEY POINTS AND IMPORTANT LINKS FOR REFERENCE

1. ANGLE SUM PROPERTY QUADRILATERAL
   https://www.youtube.com/watch?v=gFeSQK0H2iM

2. ANGLE SUM PROPERTY OF POLYGON
   https://www.youtube.com/watch?v=mw6UQtUc88M

3. SUM OF EXTERIOR ANGLES OF A POLYGON
   https://www.youtube.com/watch?v=8lOxHlgzEqw
   https://www.youtube.com/watch?v=JGuxXoTEASc

4. Find exterior angle and number of sides of regular polygon
   https://www.youtube.com/watch?v=cDKNcxMmp60

5. SOME QUESTIONS AND SOLUTIONS FOR REFERENCE
   https://www.youtube.com/watch?v=TG6czY5idC4
   https://www.youtube.com/watch?v=oEu1E2cOJj0(BASED ON EXTERIOR ANGLE PROP)
   https://www.youtube.com/watch?v=C1VfKJOQLWk

POINTS TO REMEMBER:

Angle Sum Property

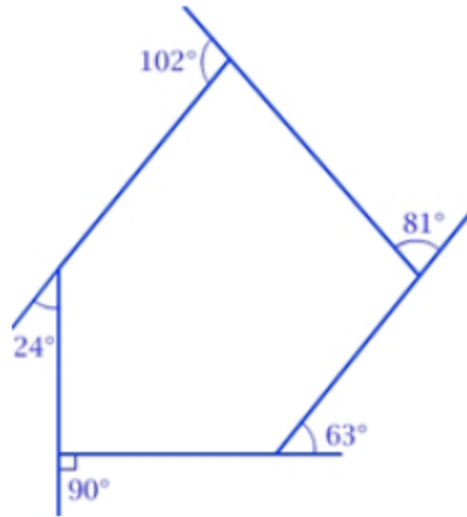1.Sum of all interior angles of a polygon is = (n-2) x180 $^{\circ}$,where n is the number of sides of a polygon.
 Remark: This property is applicable to both, convex and concave polygon.

2.Sum of the Measures of the Exterior Angles of a Polygon=360.
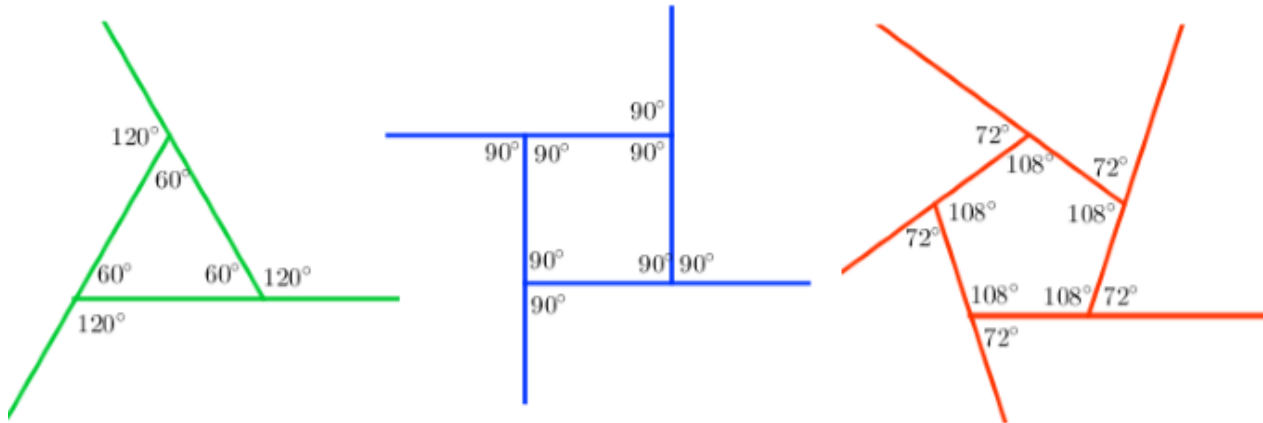
This is applicable to **irregular polygons** also. The sum will remain the same whether it is a regular or irregular, small or large polygon.

Sum of all the exterior angles in the above irregular pentagon is:

102° + 81° + 63° +90° + 24° = 360°

3.The exterior angle of a regular 'n 'sided polygon is = $\dfrac{360}{n}$.

Where **n** represents the number of sides of a regular polygon.

<u>**ASSIGNMENTS**</u>

A)From the NCERT textbook the following questions are to be done in Mathematics notebook:

      Exercise 3.1   Q4 a) , b) ;   Q6 a),b) ;   Q7 a) , b)
      Exercise 3.2   Q2 and Q3

B)Online Practice assignment to understand quadrilaterals (practice questions to be attempted online only)

1. https://www.khanacademy.org/math/in-math-by-grade/in-in-class-8th-math-cbse/xa9e4cdc50bd97244:in-in-8th-quadrilaterals/xa9e4cdc50bd97244:in-in-8th-quadrilaterals/xa9e4cdc50bd97244:in-in-8th-quad-angles-with-polygons/e/angles_of_a_polygon?modal=1
2. https://www.khanacademy.org/math/in-math-by-grade/in-in-class-8th-math-cbse/xa9e4cdc50bd97244:in-in-8th-quadrilaterals/xa9e4cdc50bd97244:in-in-8th-quadrilaterals/xa9e4cdc50bd97244:in-in-8th-quad-angles-with-polygons/e/regular-polygons-formulae-8th?modal=1

C)Objective type questions (to be done in practice notebook)

Q1.The sides of a pentagon are produced in order. Which of the following is the sum of
its exterior angles?
(i) 540°
(ii) 180°
(iii) 720°
(iv) 360°

Q 2. Which of the following is a formula to find the sum of interior angles of a polygon of
n-sides?
(i) $n \times 180^0$

(ii) $\left(\dfrac{n+1}{2}\right) \times 180°$

(iii) $\left(\dfrac{n-1}{2}\right) \times 180°$

(iv) $(n - 2) \times 180°$

Q3.How many sides a regular polygon has whose each exterior angle is 45^0?

Q4.What is the minimum interior angle possible for a regular polygon ?
a) 60^0 b)80°   c)120°   d)160°
Q5.What is the maximum exterior angle possible for a regular polygon ?
a) 60^0 b)80°   c)120°   d)160°

Q6 . The polygon in which sum of all exterior angles is equal to the sum of interior
angles is called _____.

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