

STUDY COURSE MATERIAL

MATHEMATICS

SESSION-2020-21

CLASS-VIII

Chapter-Understanding of quadrilaterals

Plane Surface: That surface at which all the perpendiculars drawn are parallel to each other is called Plane Surface.

Plane Curve: When we join a number of points without lifting a pencil from the paper and without retracing any portion of the drawing other than single points, we get a plane curve.

Open Curves: A curve, which does not cut itself, is called open curve.

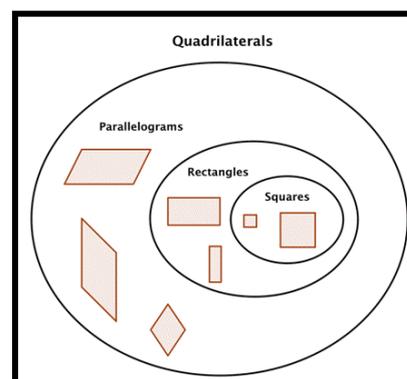
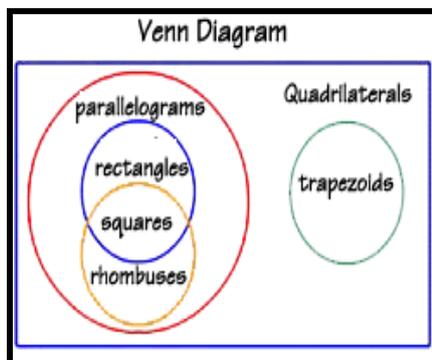
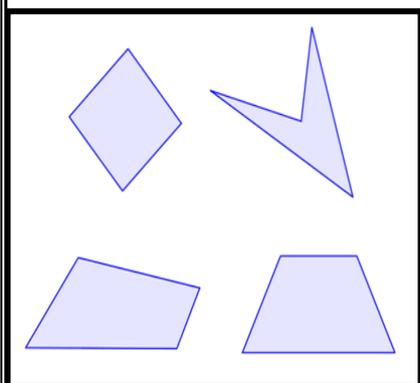
Closed Curve: A curve, which cuts itself, is called a closed curve.

Simple closed curves: A closed curve, which does not pass through one point more than once, is called simple closed curve.

Polygons: A simple closed curve made up of only line-segments is called a Polygon.

Diagonals: A line-segment joining the non-consecutive vertices of a polygon is called its diagonal.

$$\text{No of diagonal} = n \times (n-3) / 2$$



Convex Polygons: That polygon, in which a line-segment joining any two points inside it lies completely inside the figure is called the convex polygon.

Concave Polygon: When a line-segment joining a pair of points inside a Polygon does not occupy inside it completely, is called the concave polygon.

Regular & Irregular Polygons: Those polygons, whose all the sides and all the angles equal, are called regular polygons, otherwise are called irregular polygons.

(i)equilateral triangles, squares, regular pentagons, regular hexagon etc are Regular polygons

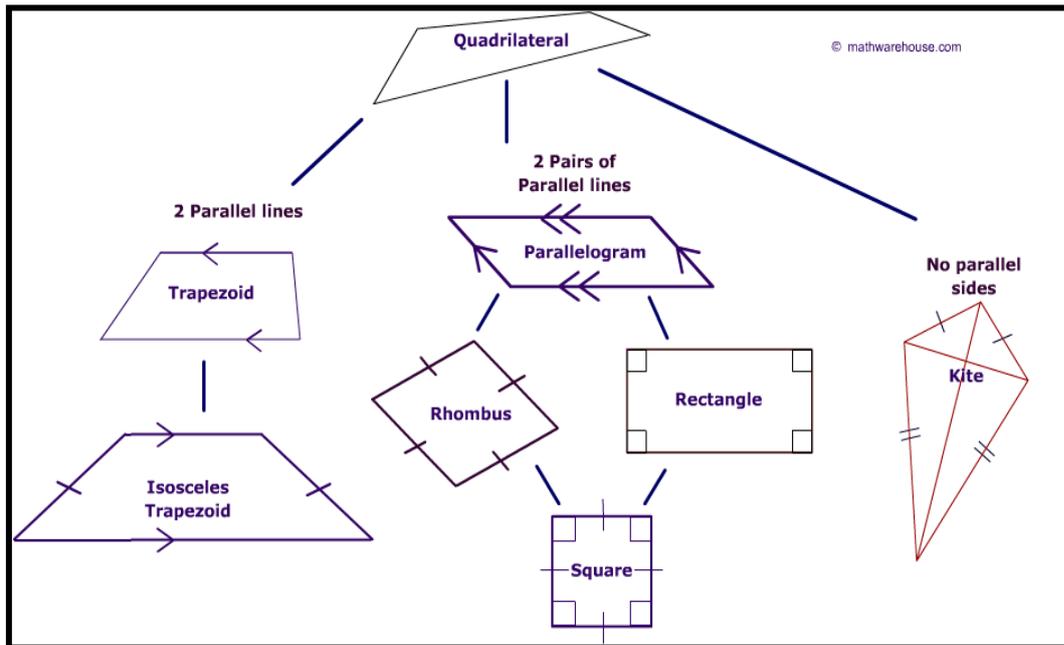
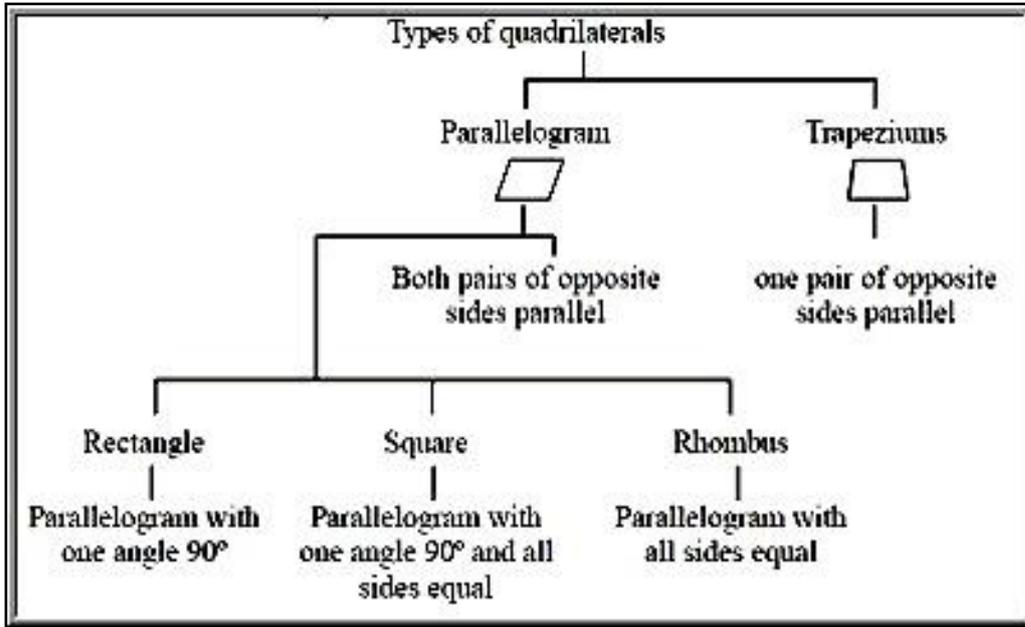
(ii)scalene triangles,scalene quadrilaterals,irregular pentagons, irregular hexagons etc.

Quadrilaterals: A polygon having four sides & four angles is called a quadrilateral.

In a quadrilateral ABCD, sides are AB, BC, CD, DA & angles are $\angle ABC$, $\angle BCD$, $\angle CDA$, $\angle DAB$.

The diagonals are AC & BD.

Classification of Quadrilaterals:



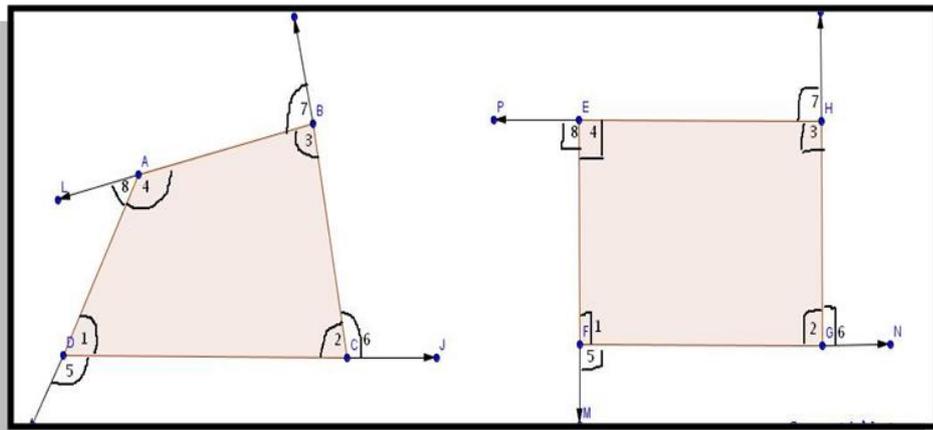
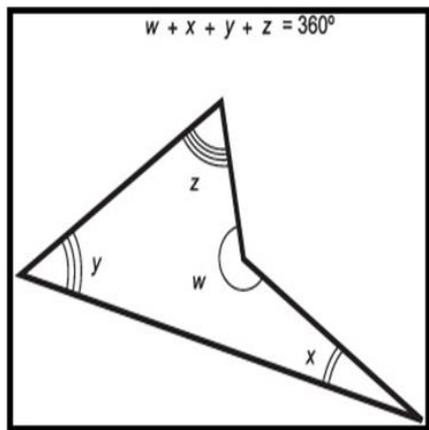
(i)trapeziums (ii)kites (iii)parallelograms(iv)rhombuses(v)rectangles (vi)squares

Angle sum property of a polygon: The sum of all the interior angles of a polygon of n-number of sides is equal to $(n-2) \times 180^\circ$

Also the sum of all the exterior angles of a polygon of n no. of sides = 360°

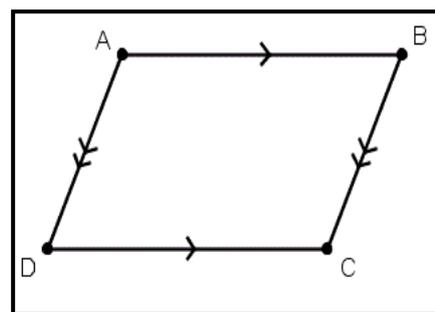
The sum of all the interior angles of a quadrilateral is 360°

The sum of all the exterior angles of a quadrilateral is 360°



Parallelogram

- (i) opposite sides are parallel & equal
- (ii) Opposite angles are equal
- (iii) Sum of a pair of adjacent angles is 180°
- (iv) Diagonals always bisect each other



Kite

- (i) Two pairs of adjacent sides are equal
- (ii) Diagonals intersect each other at 90°

Rhombus

- (i) Opposite sides are parallel
- (ii) All the sides are equal
- (iii) Diagonals perpendicularly bisect each other
- (iv) Opposite angles are equal

Rectangle

- (i) Opposite sides are equal
- (ii) All the angles are equal to 90°
- (iii) both the diagonals are equal & bisect each other

Square

- (i) all the sides are equal
- (ii) all the angles are equal to 90°
- (iii) both the diagonals are equal & bisect each other at 90°

Quadrilateral	Properties	
Rectangle	4 right angles and opposite sides equal	
Square	4 right angles and 4 equal sides	
Parallelogram	Two pairs of parallel sides and opposite sides equal	
Rhombus	Parallelogram with 4 equal sides	
Trapezium	Two sides are parallel	
Kite	Two pairs of adjacent sides of the same length	

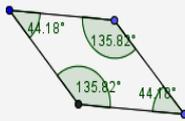
QUADRILATERAL



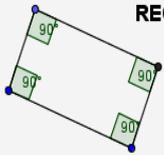
The four angles are:
Angle 1: 105°
Angle 2: 64.03°
Angle 3: 124.13°
Angle 4: 66.85°
The sum of the angles is: 360°

side = 2

RHOMBUS

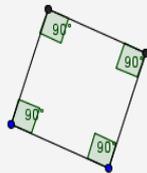


RECTANGLE



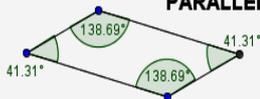
One pair of sides has length 2.5
The other pair of sides has length 1.38

SQUARE



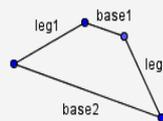
All sides have length 1.97

PARALLELOGRAM



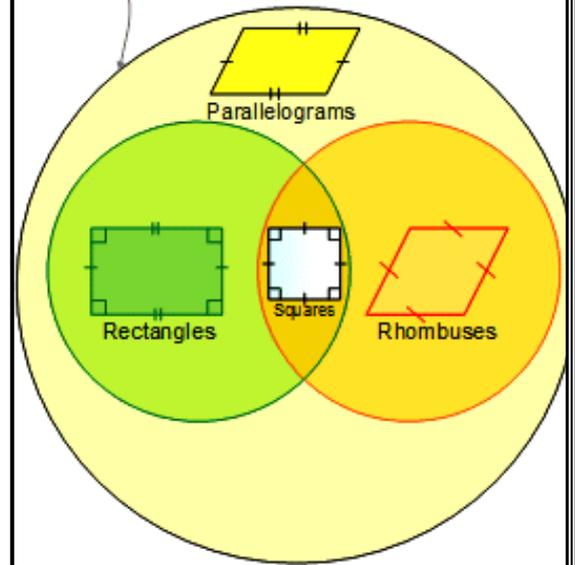
One pair of sides has length 1.52 and slope 0.5
The other pair of sides has length 2.75 and slope -0.26

TRAPEZOID



The bases have lengths 0.78 and 2.91
The legs have lengths 1.49 and 1.47
The slopes of both bases is -0.31

Venn Diagram



[Click on the links given below to watch the Videos:](#)

Link-1

<https://www.youtube.com/watch?v=2s70Qd0ap5o>

Link-2

Polygons as special curves

<https://youtu.be/hGRu2Py192w>

Link-3

Sum of interior angles of a polygon

<https://youtu.be/qG3HnRccrQU>

Link-4

Sum of the exterior angles of a polygon

<https://youtu.be/W9B3VYdC5T8>

Link-5

Intro to quadrilateral

<https://youtu.be/Ka82QC4QvGA>

Link-6

Quadrilateral properties

<https://youtu.be/5CeBlu260Rw>

Link-7

Quadrilateral types

<https://youtu.be/wPZIa3SjPF0>

MATHS APPLICATION ACTIVITIES:

DIKSHA/CBSE APP

Ncert Maths Activity 5

1. Click the Link Given:

https://diksha.gov.in/play/collection/do_3129549296622387201203?contentType=TextBook&contentId=do_3129364466599034881106

2. Link-

https://www.youtube.com/watch?time_continue=426&v=20fNLRUI9c&feature=emb_logo

3. Link-3

https://www.youtube.com/watch?v=qToZr-Cg1To&feature=emb_logo

NCERT LINK FOR REFERENCE

<http://ncert.nic.in/textbook/textbook.htm?hemh1=3-16>

ASSIGNMENT

SECTION-A

- What is the sum of all the interior angles of the following polygons each having the number sides?
(i) 5 (ii) 8 (iii) 12 (iv) 14
- What are the numbers of diagonals of the following polygons each having the number of sides
(i) 3 (ii) 7 (iii) 9 (iv) 12
- What is the sum of all the exterior angles of a polygon having 13 number of sides?
(i) 90° (ii) 270° (iii) 360° (iv) 540°
- State the name of a regular polygon with
(i) 3 sides (ii) 5 sides (iii) 7sides (iv) 8 sides
- If three angles of a quadrilateral are respectively 90° , 60° , 135° , then what is the measurement of fourth angle?
- Find the measure of each exterior angle of a regular polygon with: a)12 sides b) 18 sides

SECTION-B

- If the three exterior angles of a quadrilateral taken in an order are respectively 105° , 85° and 110° then find fourth exterior angle .Also find all the interior angles.
- One of the diagonals of a rhombus is equal to one of its sides. Find the angles of rhombus
- If the four angles of a quadrilateral are in the ratio 3:4:5:6 then find the angles.
- If the measure of an exterior angle of a regular polygon is 45° . Calculate the number of sides of that polygon. What is the name of it?
- The ratio of two sides of a parallelogram is 4:5 and its perimeter is 126cm. Find the sides of the parallelogram.
- If the diagonals of a rhombus are 6cm & 8cm. Find the lengths of its sides.

SECTION-C

- If one angle of a rhombus is 72° , then find the measures of its rest angles.
- The diagonals of rectangle ABCD are intersecting each other at O, find x if $OA = 2x+4$ and $OD = x+8$. Hence find the lengths of diagonals numerically.
- If the exterior angle of a regular polygon is $\frac{2}{3}$ of its interior angle, how many sides has that polygon?