STRONG TOWER ACADEMY

SUBJECT: MATHEMATICS.

CLASS: SSS 1.

MR OLANIYI

TOPIC: Quadrilaterals, Intercept Theorem and other Polygons.

1. **RECTANGLE**:- Rectangle is a special parallelogram and has the following symmetric properties
   i. All angles are right-angle.
   ii. The diagonals are equal in length.
   iii. Opposite sides are equal and parallel to each other.
   iv. The diagonals bisect the area of theshape and it also bisects each other.
   v. It has two lines of symmetry.
   vi. IT has two pairs of parallel sides.
2. **SQUARE**: - Square is a special rectangle and a parallelogram with the following symmetric properties
   i. All sides are equal in length.
   ii. All angles are right-angle
   iii. The diagonals are equal in length
   iv. The diagonals bisect the area of the shape, bisect each other and they meet at right-angle.
   v. It has four lines of symmetry.
   vi. It has two pairs of parallel lines.
3. **RHOMBUS:**- Rhombus is a special parallelogram and has the following symmetric properties
   i. All sides are equal in length.
   ii. Opposite angles are equal in size
   iii. The diagonals are equal in length
   iv. The diagonals bisect the shape, bisect each other and they meet at right-angle.
   v. .It has two pairs of parallel lines.
   vi. It has no line of symmetry.
4. **KITE:-** Kite is a special type parallelogram with the following symmetric properties.
   i. The two pairs of adjacent sides are equal in length.
   ii. The diagonals intersect at right-angle.
   iii. Only one of its diagonal bisect it area.
   iv. Its diagonals are not equal in length.
   v. It has a line of symmetry.
   vi. The angle formed where the two pairs of the adjacent sides are equal in size.
5. **TRAPEZIUM :-Trapezium is NOT a parallelogram but can be classified as a quadrilateral and it has the following symmetric properties**
   i. All sides are not equal in length.
   ii. All angles are not equal in size.
   iii. It has a pair of parallel line.

iv. **Its diagonals are not equal in length.**

v. **It has no line of symmetry.**

NOTE: Kite and Trapezium are non-parallelograms but they are classified as QUADRILATERALS.

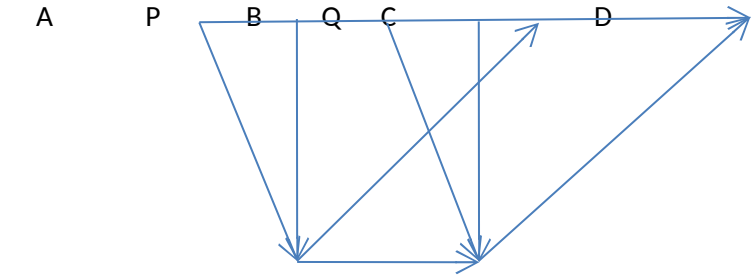
i. the sum of the interior angles of a polygon is (2n – 4)rt. Angle or (n – 2)180^0.

ii. the sum of the exterior angles of any convex polygon is360^0..

The proof:

THEOREM:.Parallelograms on the same base and between the same parallels are equal in area.

1. Two triangles on the same base or equal base and between the same are equal in area.
2. Two triangles, which has the same base or equal base and lies between the same parallel as a parallelogram, is half of the area of the area of the parallelogram.
3. Parallelograms on equal bases and between the same parallels are equal in area.



Given : Parallelogram ABEF, CDEF and triangles ACF and BDE.

Required to prove that:

i. Area of parallelogram ABEF= Area of parallelogram CDEF.

ii. Area of triangle ACF = Area of triangle BDE.

Constructions : (a) Draw line FP as an altitude of triangle ACF i.e. /FP/is perpendicular to /AC/.

(Note: /AC/ is the base of triangle ACF)

(b) Draw line EQ as an altitude of triangle BDE i.e./EQ/ is perpendicular to /BD/.

(Note: /BD/ is the base of triangle BDE)

Proof :

Area of Parallelogram ABEF = Area of Trapezium ADEF –Area of triangle BDE.

Area of Parallelogram CDEF = Area of Trapezium ADEF – Area of triangle ACF

/AB/ = /FE/ (Opposite sides of a parallelogram are equal and parallel)……..1

/CD/ = /FE/ (Opposite sides of a parallelogram are equal and parallel)……..2

Comparing equations 1 and 2

/AB/ = /CD/

Similarly :

From triangles ACF and BDE

/AB/ = /AC/ - /BC/ ……..3

/CD/ = /BD/ - /BC/ ……..4

Comparing equations 3 and 4

/AC/ = /BC/ which is enough to prove that:

Area of triangle ACF = Area of triangle BDE.

Therefore,

Area of parallelogram ABEF = Area of parallelogram CDEF.

As required.

The teacher proves the other theorems

i. Prove that the sum of the interior angles of a polygon is (2n – 4) rt, angles OR (n -2) 180^0 .
ii. Prove that the sum of the exterior angles of a convex polygon is 360^0.
iii. State and prove the intercept theorems

Essential Mathematics for Senior Secondary Schools 1**, page 212,exercise 16.1, numbers 1 and 2.**

Step 5: Give the students classroom exercises to work, supervise them while solving the questions and mark their work as you go round. Instruct the students to do correction(s) to their mistakes. Check their corrections and mark.

Essential Mathematics for Senior Secondary Schools 1**, page 212, exercise 16.1,numbers 3 to 16.**

ASSIGNMENT: The teacher writes questions on the concept taught as homework from their textbook.

Essential Mathematics for Senior Secondary Schools 1, page 216, exercise 16.2, numbers 1 to 10.