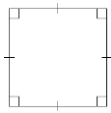# INTRODUCTION TO QUADRILATERALS
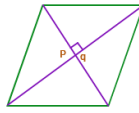
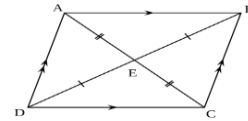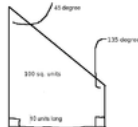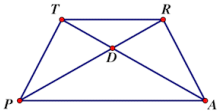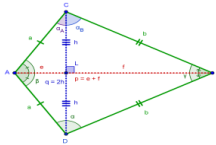**square**   **rectangle**   **rhombus**   **parallelogram**

trapezoid   **kite**

Mathematicians define regular **quadrilaterals** according to their attributes.

a) Quadrilaterals are two-dimensional closed figures that have four sides and four angles.
b) The sum of their four angles is 360 degrees.
c) When we trace diagonals from one opposite corner to another in a quadrilateral, these lines always intersect (pass it through) and in some cases they bisect (cut the other line in half).
d) Regular quadrilaterals are named square, rectangle, parallelogram, rhombus, trapezoid, and kite.
e) **VERY IMPORTANT TO REMEMBER THIS!** : Although these are the names of the quadrilaterals, these words are also the names of groups of quadrilaterals. Each group has its own characteristics or **attributes** that distinguish them from the others. For instance, the figure square belongs obviously to the group of squares, but also belongs to the groups of trapezoids, parallelograms, rectangles, rhombuses, and kites, because it shares similar attributes with them. However, the group of squares has only one figure: square. This is because no other quadrilateral shares the attributes of the squares, which are having four equal sides and four right angles.

TRAPEZOIDS

a) Trapezoids form the largest group of quadrilaterals. They include the figures of square, rectangle, parallelogram, rhombus, and of course, trapezoid.   (the figure kite does not belong to the group of trapezoids)
b) Trapezoids have only one attribute: they have at least one parallel line. Also,
  a. They may or may not have two or even four equal in length sides.
  b. They may or may not have opposite sides of the same length
  c. They may or may not have right angles, and
  d. Their diagonals may or may not bisect.

PARALLELOGRAMS

a) Parallelograms for the second largest group of quadrilaterals. They include the figures of square, rectangle, parallelogram, and rhombus. (the figures of the trapezoid and the kite do not belong to the group of parallelograms)

b) Parallelograms have the attribute of having two sets of parallel lines.

   a. They may have two or four equal in length sides.
   b. Their opposite sides have the same length.
   c. They may or may not have right angles.
   d. Their diagonals bisect each other.

RECTANGLES

a) Rectangles include only the figures of square and rectangle.

b) Rectangles have the only attribute of having four right angles.

   a. They may have two or four equal in length sides.
   b. Their opposite sides have the same length.
   c. Their diagonals bisect each other.

RHOMBUSES

a) Rhombuses include only the figures of squares and rhombuses

b) Rhombuses have only the attribute of having four equal sides.

   a. Their opposite sides are parallel.
   b. Their diagonals are perpendicular bisectors (They bisect each other and form 4 angles of 90 degrees).

SQUARES

a) Squares only include the figure of a square

b) Squares have two attributes: four equal sides and four right angles

   a. Their opposite sides are parallel.
   b. Their diagonals are perpendicular bisectors.
   c. Their consecutive or adjacent angles add to 180 degrees.

KITES

a) Kites include the figures of a square, a rhombus, and of course a kite

b) The kites have the attribute of having a set of two adjacent (next to each other) sides that are equal in length, followed by another set of two adjacent sides that are equal in length.

   a. They do not have parallel lines
   b. Their diagonal are perpendicular, but only one is bisected
   c. Their opposite angles are the same