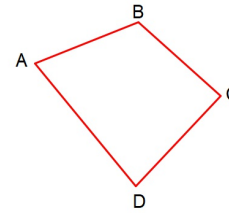**Quadrilateral:** a polygon with four sides.

A polygon is
a closed figure with at least three straight sides.

Some Vocabulary:

Vertex of a polygon: The intersection of 2 sides (a corner).

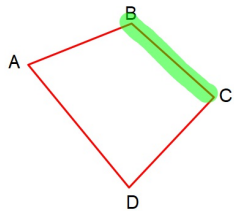How many vertices does this polygon have? **FOUR**

You name a polygon using **ALL** of its vertices.

A name for this quadrilateral could be: $\overline{ABCD}$

Why can't you use the following as a way to name this quadrilateral? **ADBC**

the vertices aren't in order (not consecutive).

Side of a polygon: Segment connecting consecutive vertices.
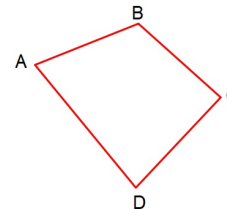
Name the highlighted side:

$\overline{BC}$ or $\overline{CB}$

Name a segment that isn't a side:

$\overline{AC}$ or $\overline{BD}$

Diagonal of a polygon: Segment connecting two non-consecutive vertices.
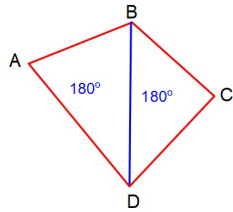
Name a diagonal: $\overline{BD}$ or $\overline{AC}$

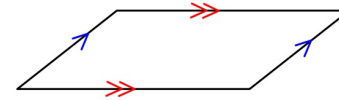The sum of the interior angles of every Quadrilateral is

360º

B

A

180º   180º   C

Drawing diagonal $\overline{BD}$ creates two triangles and each triangle has a sum of 180º.
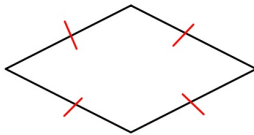
D

Parallelogram: A quadrilateral with both pairs of opposite sides parallel.

Some properties of a Parallelogram that you already know:

opposite sides are congruent.
opposite angles are congruent.

Rhombus: A quadrilateral with four congruent sides.

Some properties of a Rhombus that you already know:

Opposite sides are parallel.
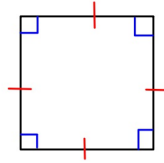Opposite angles are congruent.

Rectangle: A quadrilateral with four right angles.

Some properties of a Rectangle that you already know:

opposite sides are congruent.
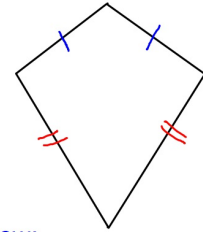opposite sides are parallel.

Square: A quadrilateral with four congruent sides and four right angles.

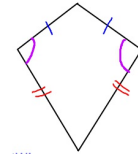**Some properties of a Square that you already know:**

Diagonals are congruent.
Opposite sides are parallel.

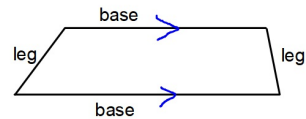**Kite:** A quadrilateral with two pairs of adjacent sides congruent and no opposite sides congruent.

Some properties of a Kite that you already know:

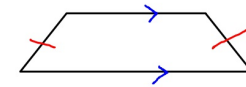one pair of opposite angles are congruent.

Trapezoid: A quadrilateral with exactly one pair of parallel sides.

base

leg   leg

base

Some properties of a Trapezoid that you already know:

Isosceles Trapezoid: A trapezoid whose nonparallel sides are congruent (legs).

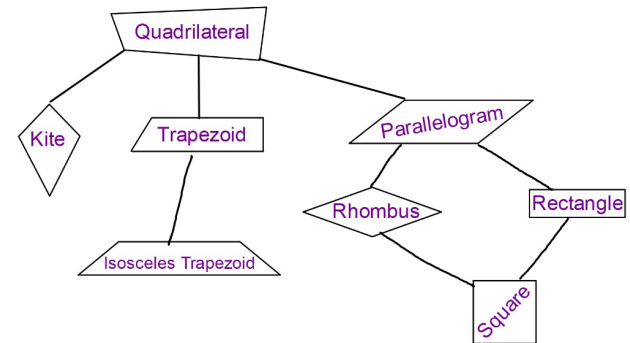**Some properties of an Isosceles Trapezoid that you already know:**

Both pair of base angles are congruent.

Quadrilateral Tree Diagram (Hierarchy)

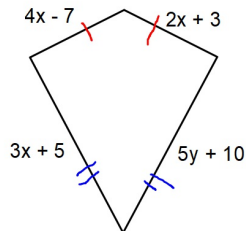Make a tree diagram showing the hierarchy and relationships amongst these quadrilaterals.

Kite   Square

Trapezoid   Rectangle

Parallelogram Isosceles Trapezoid

Rhombus   Quadrilateral

Quadrilateral Hierarchy:

Find the value of each variable and the lengths of each side.

Kite

4x - 7   2x + 3

3x + 5   5y + 10

Consecutive Sides are equal:

$$4x - 7 = 2x + 3$$
$$2x - 7 = 3$$
$$2x = 10$$
$$x = 5$$

Replace all x's with 5: Three of the sides are 13, 13, and 20

These consecutive sides are also equal and we know that 3x+5=20 so:

$$5y + 10 = 20$$
$$5y = 10$$
$$y = 2$$

The four side lengths are: 13, 13, 20, & 20

Find the value of each variable and the lengths of each side.

Parallelogram:

4y + 9
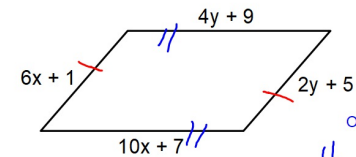
6x + 1   2y + 5

10x + 7

Opposite sides are equal:

$$6x + 1 = 2y + 5$$
$$6x - 2y = 4$$

write both equations in Standare Form

solve this system of equations using Elimination:

$$-2(6x - 2y = 4)$$
$$10x - 4y = 2$$

Opposite sides are equal:

$$4y + 9 = 10x + 7$$
$$10x - 4y = 2$$

$$-12 + 4y = 8$$
$$10x - 4y = 2$$
$$\frac{-2x}{-2} = \frac{-6}{-2}$$
$$x = 3$$

Now find y

$$6(3) + 1 = 2y + 5$$
$$19 = 2y + 5$$
$$14 = 2y$$
$$y = 7$$

Use these values of x & y to find the lengths of the sides: 13, 13, 20, 20

Hwk #2   Sec 6-1

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Problems 21, 22, 24-26, 36-39