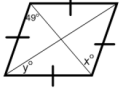


### Bell Work

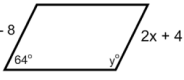
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1. Classify the quadrilateral. Explain your reasoning. Find the values of  $x$  and  $y$ .
 


2. Decide whether the statement is always, sometimes or never true.
  - a) A rhombus is a square.
  - b) A square is a rhombus.
  - c) A parallelogram is a rectangle.

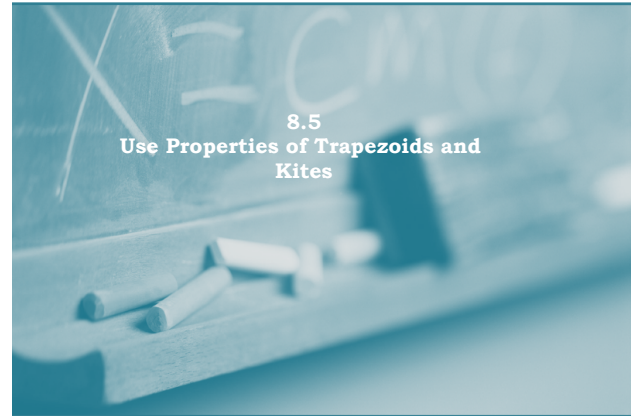
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3. Find the values of  $x$  and  $y$ .
 


4. ABCDEF is a regular hexagon. Find the measure of **each** interior and exterior angle.
 

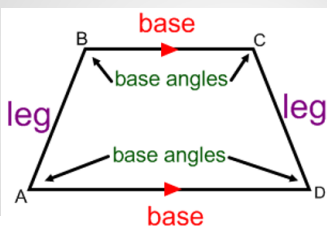
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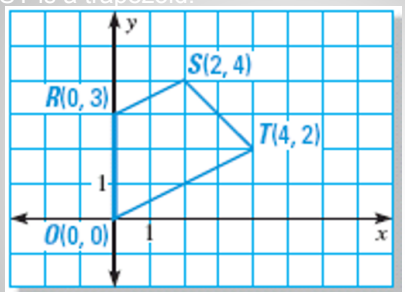
### Trapezoid

- A type of quadrilateral with exactly one pair of parallel sides
- Parallel sides are the bases
- Nonparallel sides are the legs
- Trapezoid has two pairs of base angles; two angles that make up the base



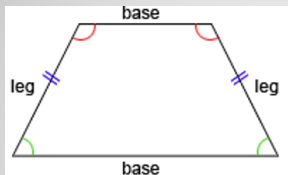
### Example 1

Show that ORST is a trapezoid.



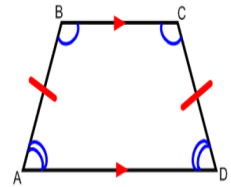
### Isosceles Trapezoid

- In an isosceles trapezoid the legs of the trapezoid are congruent



### Theorem 6.21

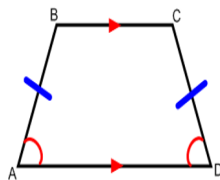
If a trapezoid is isosceles, then each pair of base angles is congruent.



If trapezoid ABCD is isosceles, then  $\angle A \cong \angle D$  and  $\angle B \cong \angle C$ .

### Theorem 6.22

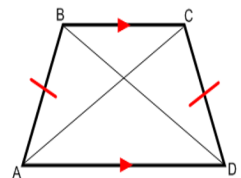
If a trapezoid has a congruent pair of base angles, then it is an isosceles trapezoid.



If  $\angle A \cong \angle D$  and  $\angle B \cong \angle C$ , then ABCD is an isosceles trapezoid.

### Theorem 6.23

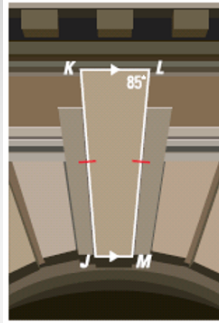
A trapezoid is isosceles if and only if its diagonals are congruent.



Trapezoid ABCD is isosceles if and only if  $\overline{AC} \cong \overline{BD}$ .

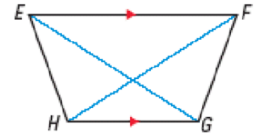
### Example 2

The stone above the arch in the diagram is an isosceles trapezoid. Find  $m\angle K$ ,  $m\angle M$ , and  $m\angle J$ .



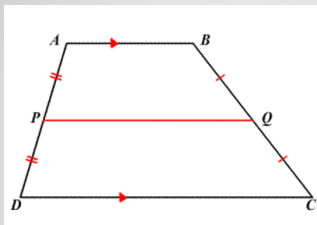
### Example 3

If the  $m\angle HEF = 70^\circ$  and  $m\angle FGH = 110^\circ$ , is the trapezoid EFGH isosceles?



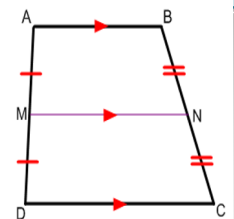
### Midsegment of a Trapezoid

- The segment that connects the midpoints of its legs



### Theorem 6.24

The midsegment of a trapezoid is parallel to each base and its length is one half the sum of the lengths of the bases.

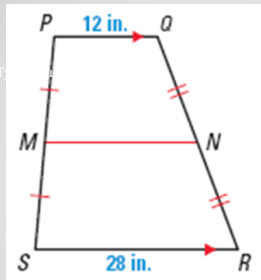


If MN is the midsegment of trapezoid ABCD, then  $MN \parallel AB$ ,  $MN \parallel DC$ , and  $MN = \frac{1}{2}(AB + CD)$

### Example 4

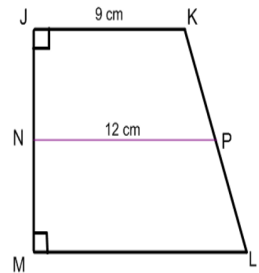
In the diagram, MN is the midsegment of trapezoid PQRS. Find MN.

Midsegment =  $\frac{1}{2}(\text{base} + \text{base})$



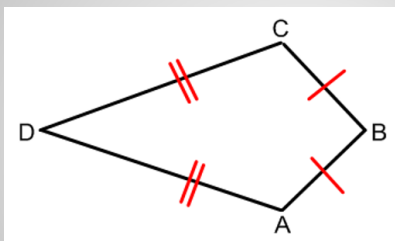
### Example 5

In the diagram, NP is the midsegment of trapezoid JKLM. Find ML.



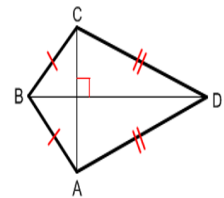
### Kite

A type of quadrilateral what has two pairs of consecutive congruent sides, but opposite sides are not congruent



### Theorem 6.25

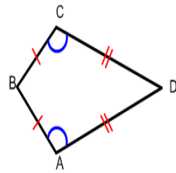
If a quadrilateral is a kite, then its diagonals are perpendicular.



If quadrilateral ABCD is a kite, then  $\overline{AC} \perp \overline{BD}$ .

Theorem 6.26

If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.



If quadrilateral ABCD is a kite and  $BC \cong BA$ , then  $\angle A \cong \angle C$  and  $\angle B \not\cong \angle D$ .

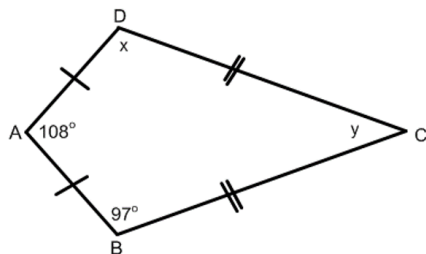
Example 6

- Find  $m\angle D$  in the kite shown at the right.



Example 7

Find the values of x and y.



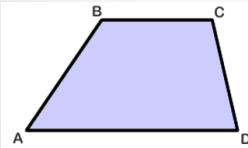
Example 8

- In a kite, the measures of the angles are  $3x$ ,  $75^\circ$ ,  $90^\circ$ , and  $120^\circ$ . Find the value of x. What are the measures of the angles that are congruent?

### Card 6 : Trapezoid

- One pair of parallel sides.
- Leg angles are supplementary.

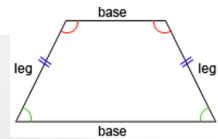
Quadrilateral { ● A polygon with four sides.  
● Interior angles add to  $360^\circ$



### Card 7 : Isosceles Trapezoid

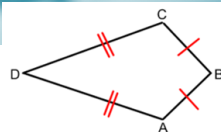
- One pair of parallel sides.
- Leg angles are supplementary.
- Base angles are congruent.
- Legs are congruent.
- Diagonals are congruent.

**Trapezoid**



### Card 8 : Kite

- One pair of opposite angles are congruent.
- Two pairs of consecutive sides are congruent. (Opposite sides are NOT congruent)
- Diagonals are congruent.



Quadrilateral { ● A polygon with four sides.  
● Interior angles add to  $360^\circ$

