

8.1 Find Angle Measures in Polygons

VOCABULARY

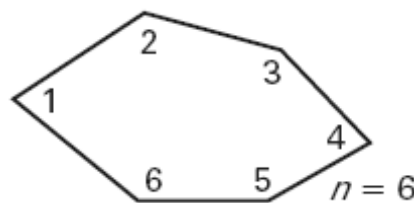
DIAGONAL	
----------	---

Review:

EQUILATERAL				
EQUIANGULAR				
REGULAR				
CLASSIFYING POLYGONS	Number of sides	Type of polygon	Number of sides	Type of polygon
	3	Triangle	8	Octagon
	4	Quadrilateral	9	Nonagon
	5	Pentagon	10	Decagon
	6	Hexagon	12	Dodecagon
	7	Heptagon	n	n -gon

Polygon Interior Angle Theorem:

The sum of the measures of the interior angles of a convex n -gon is $(n - \text{_____}) \cdot \text{_____}$.



Remember:
 $n = \#$ sides and angles

Find the sum of the interior angles of the following polygons:

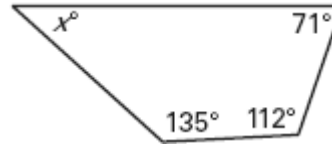
Polygon	Work	Interior angle sum
Pentagon		
Nonagon		

Examples:

Find the sum of the interior angles of the following convex polygon.



Find the value of x in the diagram shown.

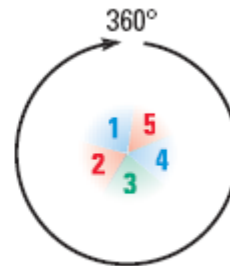
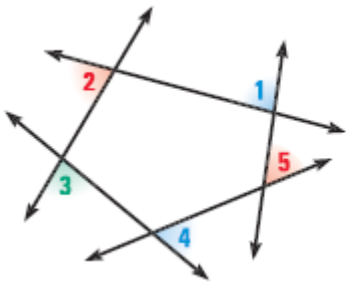


Find the number of sides (n) of a polygon:

The sum of the measures of the interior angles of a convex polygon is 1800° . Classify the polygon by the number of sides.

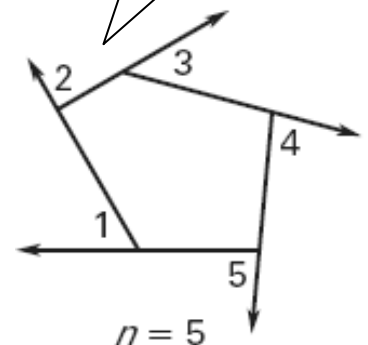
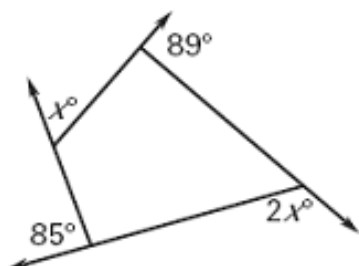
Polygon Exterior Angle Theorem:

Unlike the interior angle theorem, the sum of the exterior angles does *not* depend on how many sides the polygon has.



Notice that an exterior angle and the adjacent interior angle make a LINEAR PAIR.

Find the value of x in the diagram shown.



Find angle measures in **REGULAR** polygons:

To find one interior angle of a **REGULAR** polygon:

To find one exterior angle of a **REGULAR** polygon:

EXAMPLES:

Lamps The base of a lamp is in the shape of a regular 15-gon.

(a) Find the measure of each interior angle.

(b) Find the measure of each exterior angle.

Remember: One interior angle and its adjacent exterior angle make a LINEAR PAIR.

If one exterior angle of a regular polygon is 36° , what is the name of the polygon?

8.1 Review

Use your polygon rules to find the following. Show ALL work for full credit.

1. Find the **sum** of the measure of the interior angles of a convex **decagon**.

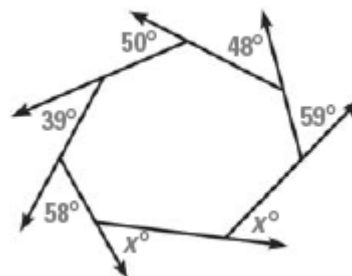
2. Find the **sum** of the exterior angles of a convex **decagon**.

3. If the **sum** of the measure of the interior angles is 1080° , then classify the polygon by the number of sides.

4. Find **one interior angle** of a regular nonagon.

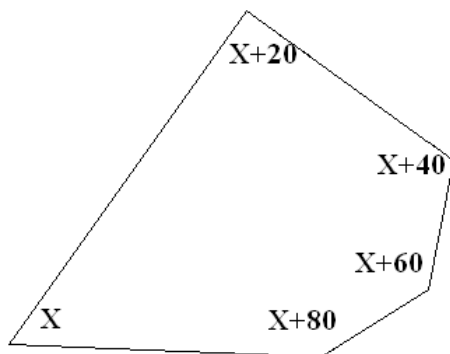
5. If **one exterior angle** of a regular polygon is 18° , then how many sides does the polygon have?

6. Find **x**.



7. Find the sum of the interior angles and the x.

Sum of interior angles = _____



x = _____

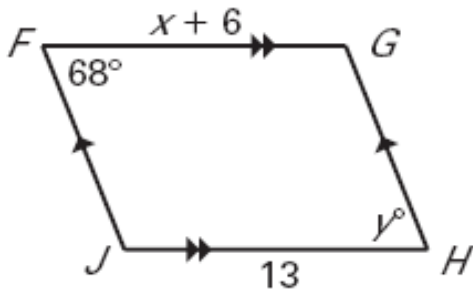
VOCABULARY

A diagram illustrating a 2x2 grid structure, likely representing a coordinate system or a classification scheme. The grid is divided into four quadrants by a vertical line and a horizontal line. The quadrants are numbered 1, 2, 3, and 4, starting from the top-left and moving clockwise. The horizontal bands (rows) are shaded gray, while the vertical bands (columns) are white. The numbers 1, 2, 3, and 4 are placed in the top-left, top-right, bottom-left, and bottom-right quadrants, respectively.

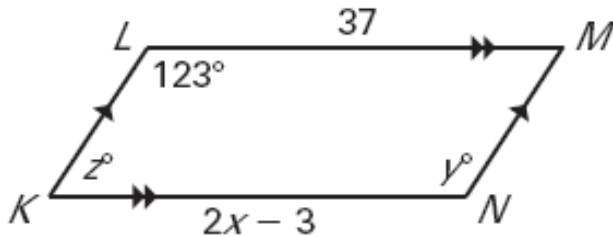
1.	2.
3.	4.

EXAMPLES:

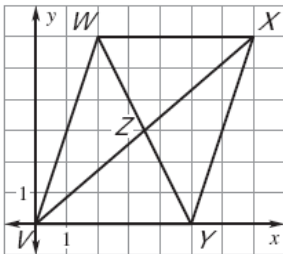
1) Find the values of x and y . *Explain which property you used to find each.*



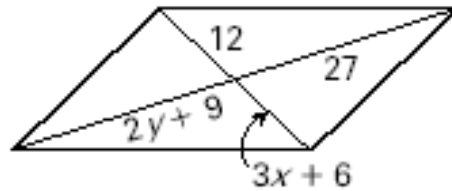
2) Find the value of x , y , and z in parallelogram $LMNK$. *Explain which property you used to find each.*



3) Find the coordinate for point Z .



4) Find the value of x and y .



5) Find the specified measures in parallelogram $HIJK$.

$$HI = \underline{\hspace{2cm}}$$

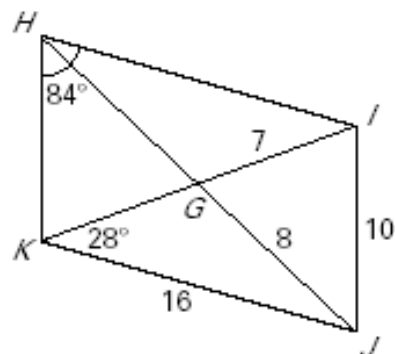
$$KH = \underline{\hspace{2cm}}$$

$$GH = \underline{\hspace{2cm}}$$

$$HJ = \underline{\hspace{2cm}}$$

$$m\angle KIH = \underline{\hspace{2cm}}$$

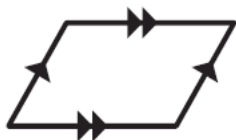
$$m\angle JIH = \underline{\hspace{2cm}}$$



8.3 Show that a Quadrilateral is a Parallelogram

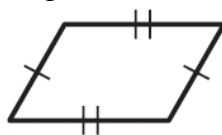
WAYS TO PROVE A QUADRILATERAL IS A PARALLELOGRAM:

1. Show both pairs of opposite sides are parallel.



Write:

2. Show both pairs of opposite sides are congruent.



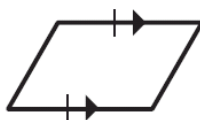
Write:

3. Show both pairs of opposite angles are congruent.



Write:

4. Show one pair of opposite sides are congruent and parallel.



Write:

5. Show the diagonals bisect each other.

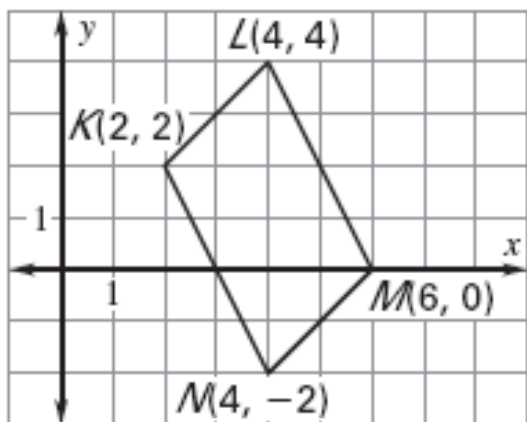


Write:

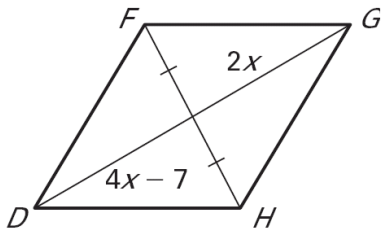
I know that we learned yesterday that one of the properties of a parallelogram is that the consecutive angles are supplementary. Remember that rule proves lines are parallel so that reason goes with #1.

EXAMPLES:

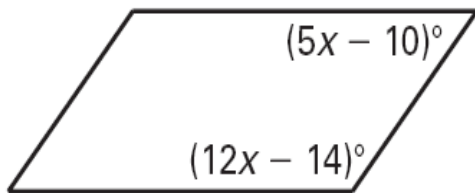
1) Show that quadrilateral $KLMN$ is a parallelogram.



2) For what value of x is quadrilateral $DFGH$ a parallelogram?

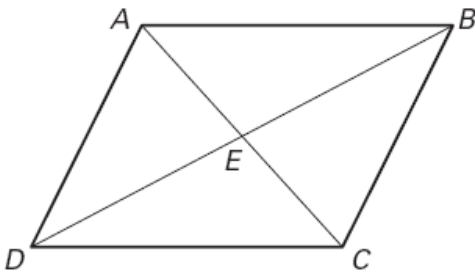


3) What value of x makes the quadrilateral a parallelogram?

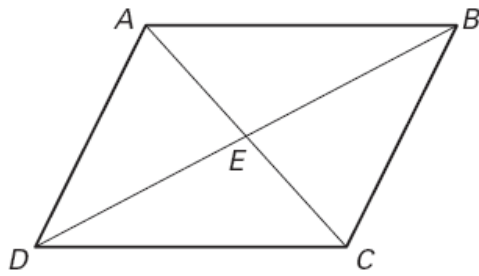


4) What additional information is needed in order to prove that quadrilateral $ABCD$ is a parallelogram?

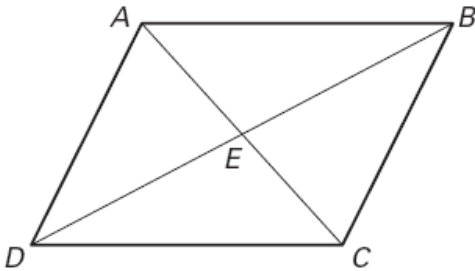
$$\overline{AB} \parallel \overline{DC}$$



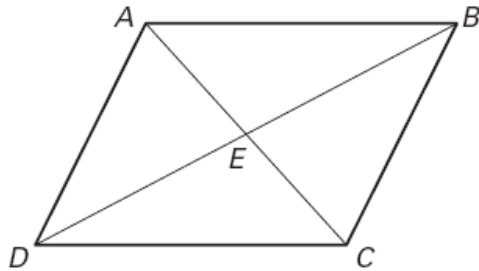
$$\overline{AB} \cong \overline{DC}$$



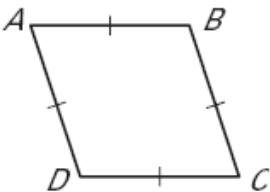
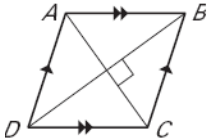
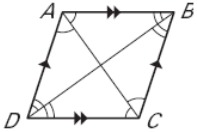
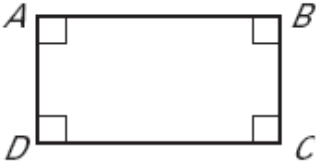
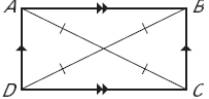
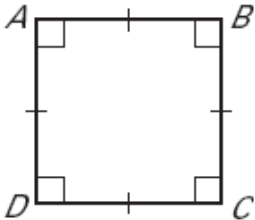
$$\angle DCB \cong \angle DAB$$



$$\overline{DE} \cong \overline{EB}$$



8.4 Properties of Rhombuses, Rectangles, and Squares

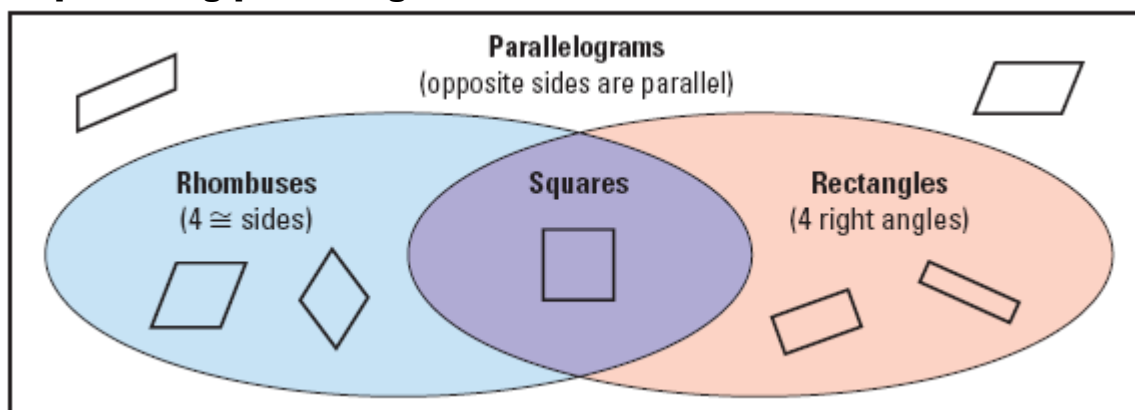
Parallelogram	REVIEW: Write down the 5 properties of a parallelogram.
Rhombus	
	<p>Properties:</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>
	<p>Show a quadrilateral is a rhombus:</p> <ol style="list-style-type: none"> 1) A quadrilateral with four congruent _____. 2) A parallelogram with _____ diagonals. 3) A parallelogram with each diagonal that _____ a pair of opposite angles.
Rectangle	
	<p>Properties:</p> <div style="text-align: right;">  </div>
	<p>Show a quadrilateral is a rectangle:</p> <ol style="list-style-type: none"> 1) A quadrilateral with four _____. 2) A parallelogram with _____ diagonals.
Square	

Properties:

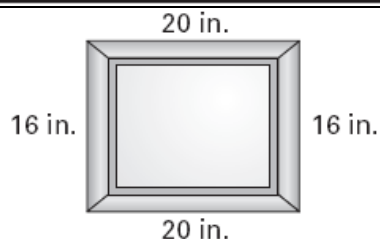
Show a quadrilateral is a square:

1) A quadrilateral that is a _____ and a _____.

Relationships among parallelograms:

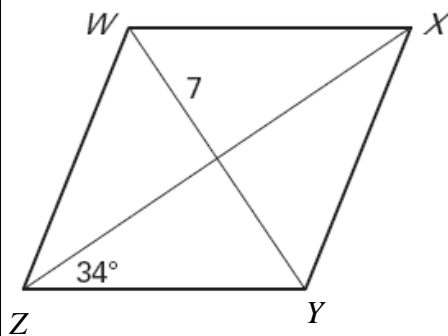


Framing You are building a frame for a painting. The measurements of the frame are shown at the right.

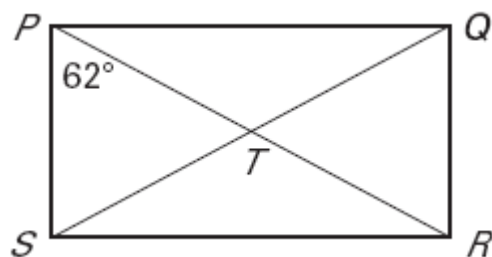


You measure the diagonals of the frame. The diagonals are about 25.6 inches. What can you conclude about the shape of the frame?

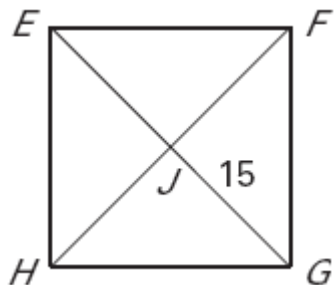
Given rhombus WXYZ.



Given rectangle PQRS with QS=18

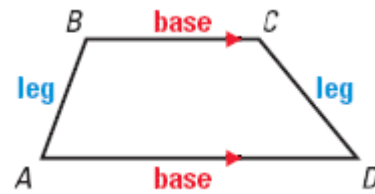


Given square EFGH


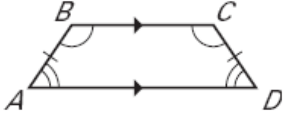
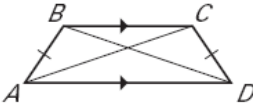


8.5 Use Properties of Trapezoids and Kites

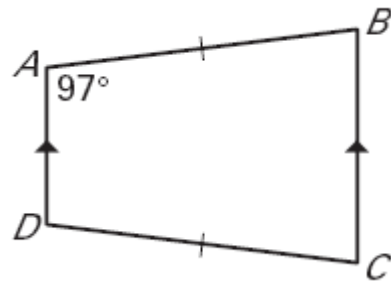
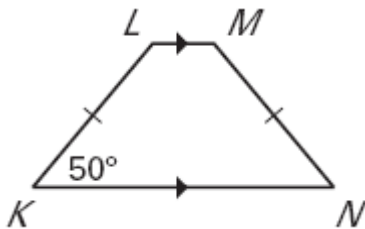
TRAPEZOIDS:

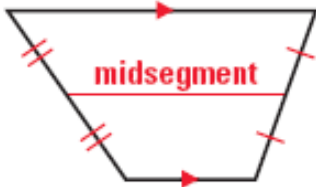


Isosceles Trapezoid:

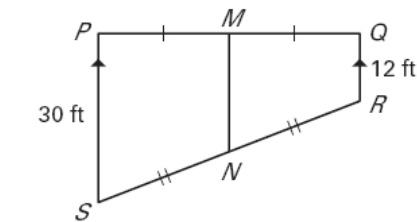
Definition	
Properties	<p>1) Both pairs of base angles are _____</p>  <p>2) Diagonals are _____</p> 

Find the missing angles in the following isosceles trapezoids.

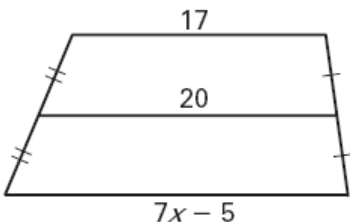


Midsegment of a Trapezoid	
--	---

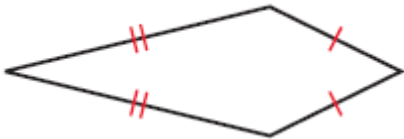
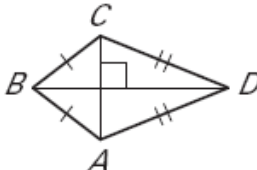
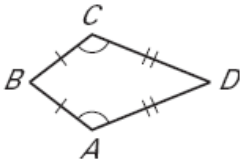
Find the length of the midsegment.



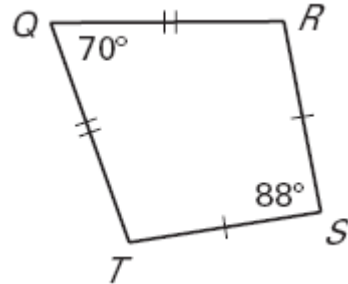
Find the value of x.



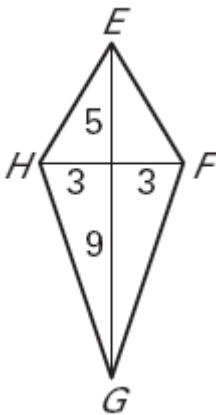
KITE

Definition	
Properties	<div> 1) Diagonals are _____.  </div> <div> 2) One pair of opposite angles are _____.  </div> <div> Do you see the congruent triangles? 3) One diagonal _____ the other. </div> <div> 4) One diagonal _____ a pair of angles. </div>

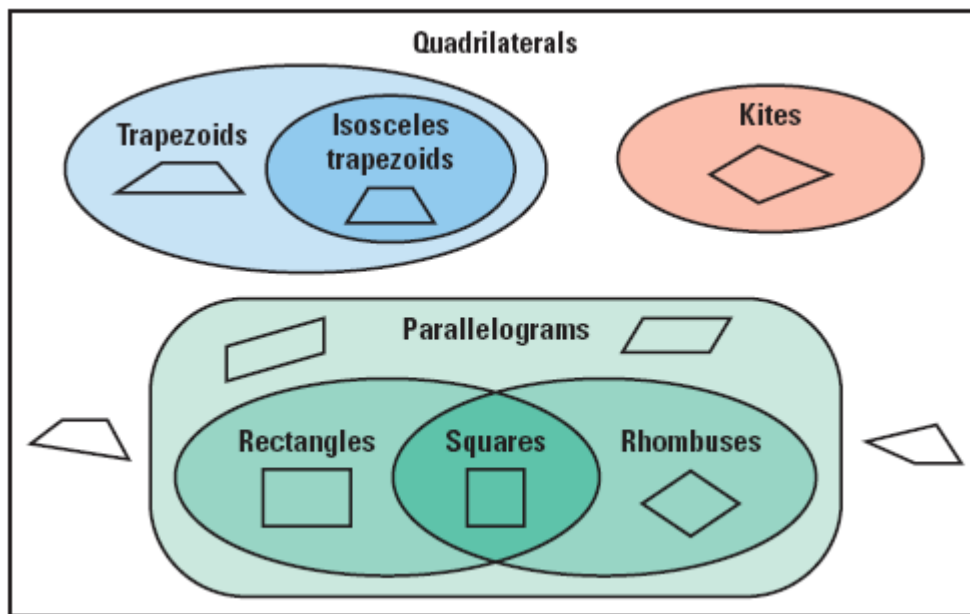
Find the measures of the missing angles.



Find the missing sides of the kite.



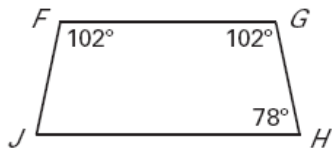
8.6 Identify Special Quadrilaterals



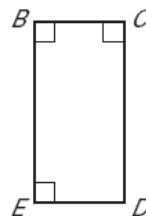
Give the most descriptive name for the quadrilateral. (*Don't base decision on looks*)

Is enough information given in the diagram to show that the quadrilateral is ...


an isosceles trapezoid



a rectangle



Do #3-11 on the chart below

Property		Rectangle	Rhombus	Square	Kite	Trapezoid
All sides are \cong .						
Both pairs of opp. sides are \cong .						
Both pairs of opp. sides are \parallel .						
Exactly 1 pair of opp. sides are \parallel .						
All \angle s are \cong .						
Exactly 1 pair of opp. \angle s are \cong .						
Diagonals are \perp .						
Diagonals are \cong .						
Diagonals bisect each other.						