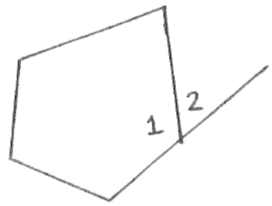
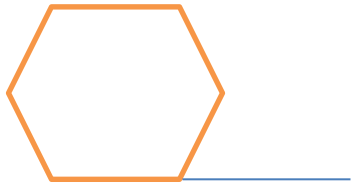
H.Geometry – Chapter 5– Definition Sheet

Section 5.1	
Definitions for ANY polygon	
Interior Angle	Angles formed by two sides of a polygon in the polygon's ________________________
Exterior Angle	Angle forming a ____________________________ with an interior angle
	
Notation for Any Polygons	
______________	• # of sides of a polygon • # of vertices of a polygon • # of angles (interior) of a polygon
______________	• Sum of the measures of the ______________________ angles in a polygon (n-gon)
______________	• Sum of the measures of the exterior angles in an n-gon
Definition of Regular Polygons	A polygon that is both _____________________ and ____________________
Notation for Regular Polygons	
______________	• Measure of one _______________ angle of a Regular Polygon
______________	• Measure of one _______________ angle of a Regular Polygon
	

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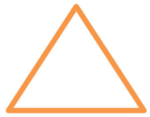
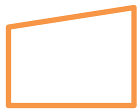
<u>Investigation:</u>
Finding the sum of the interior angles of an n-gon

Steps:

(1) Draw a convex polygon (each group gets a type of polygon with different n-values)
(2) Draw all the diagonals from one vertex (how many did you draw?)
(3) The diagonals cut the polygon into triangles. How many triangles (non-overlapping) were formed?
(4) Each triangle has a sum of the measures of the interior angles of _______ degrees. Use this information to find the sum of the angles in your polygon.
(5) Add your results to the table.

# of sides (n)	# of diagonals (non-overlapping)	# of triangles (non-overlapping)	Sum of the interior angles (S_i)
3 			
4 			
5			
6			
7			
8			
9			
n			

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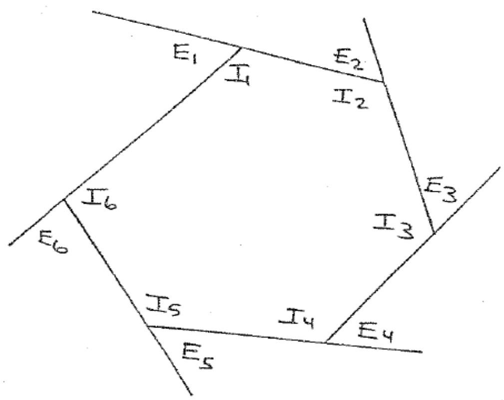
Polygon Sum Theorem	The sum of the measure of the interior angles of an n-gon is: _____________________ **<u>Example:</u>** Find the sum of the interior angles of a: Decagon Dodecagon 40-gon **<u>Example:</u>** The sum of the interior angles of a polygon is 2,700°. How many sides does the polygon have?
Regular Polygon Interior Angle Theorem	The measure of ________ interior angle of a regular polygon is: _____________________ O r _____________________ **<u>Example:</u>** Find the measure of one interior angles of a: Regular Octagon Regular 18-gon **<u>Example:</u>** The measure of one interior angle of a regular polygon is 165.6°. How many sides does the regular polygon have?

H.Geometry – Chapter 5– Definition Sheet

Section 5.2	
Recall: **Exterior Angle of a Polygon**	Forms a ___________________________ with one of the interior angles of the polygon

Investigation:

Finding the sum of the exterior angles (one at each vertex) of a polygon.



At any given vertex:

I + E = ______________

<u>Summing all interior and exterior angle pairs:</u>

<u>Solving to find sum of exterior angles (S_e)</u>

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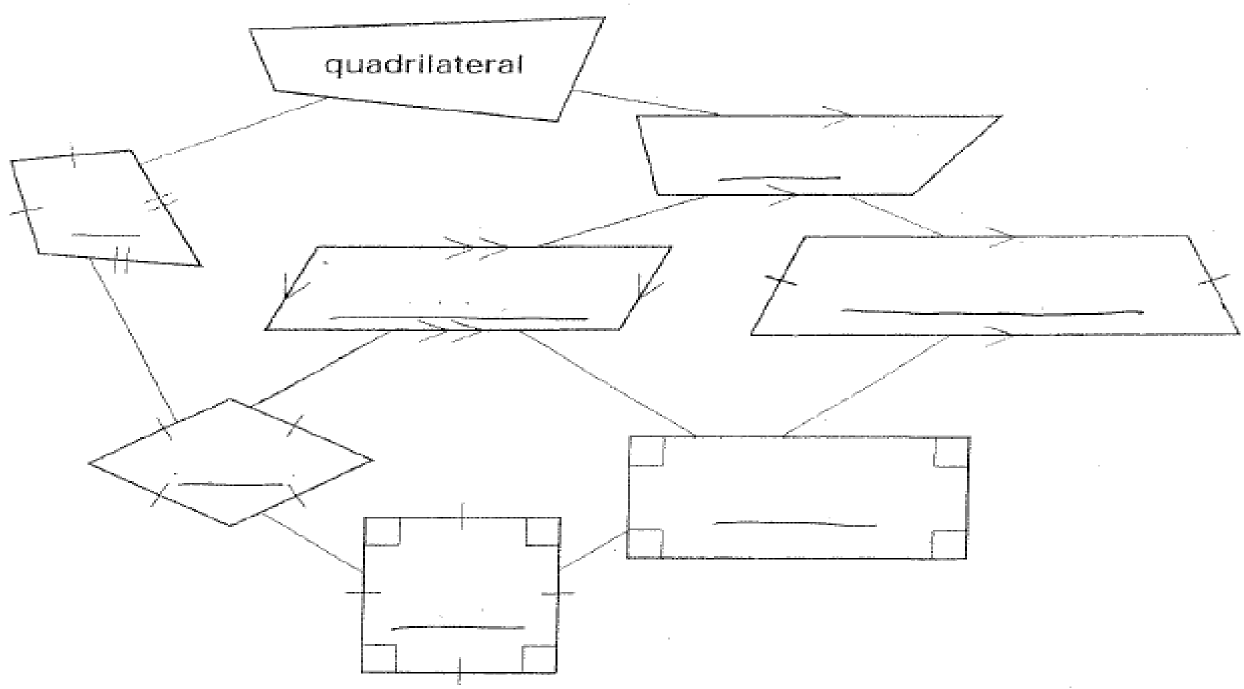
Exterior Angle Sum Theorem	The sum of the measure of the exterior angles (one at each vertex) is: ___________
Regular Polygon Exterior Angle Theorem	The measure of one exterior angle of a ___________________ (or ________________) polygon is: _________________________ **<u>Example:</u>** Find the measure of one exterior angle of a: Regular Octagon Regular 20-gon **<u>Example:</u>** One exterior angle of a regular polygon has a measure of 7.2°. How many sides does the polygon have?

Hierarchy of Quadrilaterals

(TREE DIAGRAM)



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Section 5.3 (Day 1)

Recall:
Definition of a Trapezoid

A quadrilateral with ______________________ one pair of parallel sides

____________ - 2 parallel sides

____________ - 2 non-parallel sides

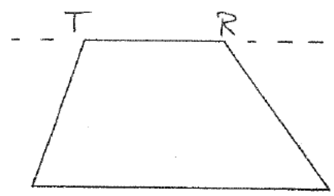
______________________ - angles at both ends of the base

____ - angles at both ends of a leg

INVESTIGATION PROOF:

GIVEN: Trapezoid TRAP w/bases
TR and AP

PROVE: <T and <P are suppl.



CONCLUSIONS	JUSTIFICATIONS
0. TRAPEZOID TRAP WITH BASES $\overline{TR}$ AND $\overline{AP}$	0. GIVEN

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Recall: **Definition of Isosceles Trapezoid**	A trapezoid with ____ CONSTRUCT: Isosceles Trapezoid (what can you conclude?)
____________________________	Both sets of ___________________________ in an isosceles trapezoid are ________________________ .

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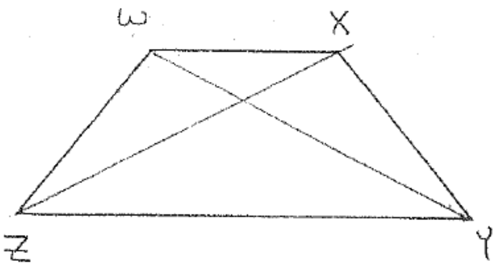

GIVEN : ISOSCELES TRAPEZOID WXYZ WITH BASES $\overline{WX}$ AND $\overline{YZ}$

PROVE : $\overline{WY} \cong \overline{XZ}$

CONCLUSIONS	JUSTIFICATIONS

Isosceles Trapezoid ____________________ Theorem	The ________________ of an isosceles trapezoid are ________________________

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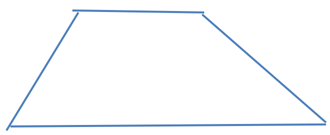
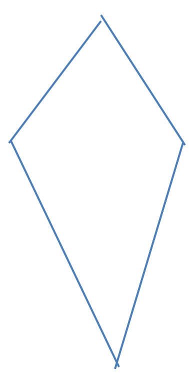
Section 5.3 (Day 2)	
REVIEW: **Trapezoid Characteristics** 	____ ____ ____
Isosceles Trapezoid Characteristics 	____ ____ ____
Definition of Kite	A quadrilateral with exactly ______________________ of distinct congruent ____________________ sides.
Parts of a Kite	__________________________ - The angles formed by the congruent sides _________________________ - The angles formed by the non-congruent sides. 

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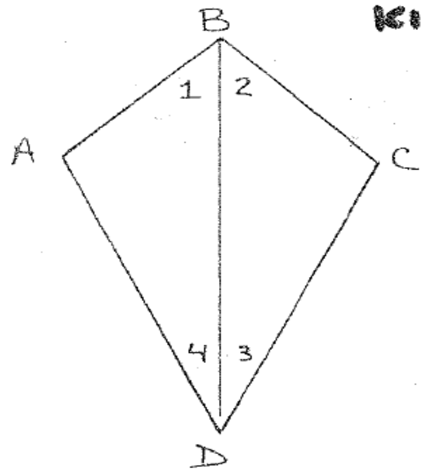
PROOF OF: **KITE ANGLE BISECTOR THEOREM**
KITE ANGLES THEOREM



GIVEN: KITE ABCD WITH VERTEX ∠'S ∠B AND ∠D

PROVE: ① $\angle 1 \cong \angle 2$
$\angle 3 \cong \angle 4$

② $\angle A \cong \angle C$

CONCLUSIONS	JUSTIFICATIONS
0. KITE ABCD WITH VERTEX ∠'S ∠B AND ∠D	0. GIVEN

Kite Angle Bisector Theorem	The diagonal Connecting the vertex angles of a kite is the ______________________________ of the vertex angles.
Kite Angles Theorem	The non-vertex of a kite are ______________________________.

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Investigation:

Draw a line and label the endpoints “A” and “C”
Construct a kite ABCD with AC as a diagonal
Construct the perpendicular bisector of AC.

What do you notice about your perpendicular bisector?

Kite Diagonals Theorem	The diagonals of a kite are ___________________________________.
Kite Diagonal Bisector Theorem	The diagonals connecting the vertex angles of a kite is the _____________________ _________________ of the other diagonal.

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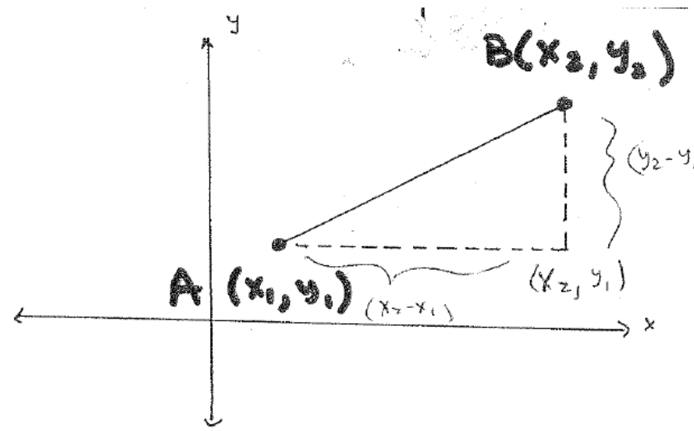
Distance Formula/Coordinate Proofs	
Distance Formula	 ____ Where: d = ____________________________________ (x_1, y_1) = ________________________________ (x_2, y_2) = ________________________________ **<u>Examples:</u>** Find the distances between: 1.) $A(2,3)\ and\ B(8,9)$ AB = _______________ 2.) $C(4,6)\ and\ D(0,-4)$ CD = _______________ 3.) $E(-7,5)\ and\ F(-3,8)$ EF = _______________ 4.) $G(-10,11)\ and\ H(-31,-25)$ GH = _______________

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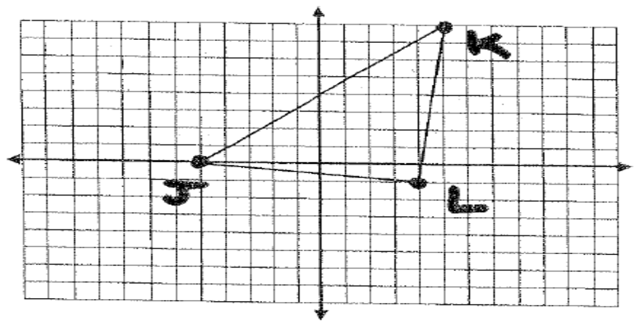
Coordinate Proofs	- Proofs done on a coordinate plane - Use ___________________ to determine if lines are ______________________ or ____________________________ ______________________________ ___________________________________ - Use ___________________ to determine if lines are ________________________ ______________________________

EXAMPLE 5.

GIVEN: J (−5,0)
K (5,8)
L (4,−1)

PROVE: △JKL IS ISOSCELES

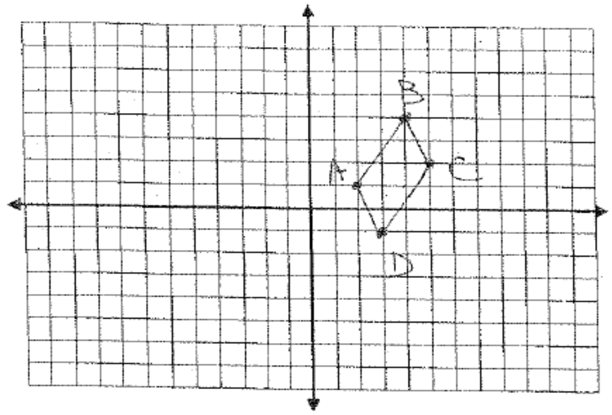


CONCLUSIONS	JUSTIFICATIONS
0. J (−5,0) K (5,8) L (4,−1)	0. GIVEN

EXAMPLE 6.

GIVEN: A (2, 1)
B (4, 4)
C (5, 2)
D (3, −1)

PROVE: ABCD IS A PARALLELOGRAM



CONCLUSIONS	JUSTIFICATIONS
0. A (2, 1) B (4, 4) C (5, 2) D (3, −1)	0. GIVEN

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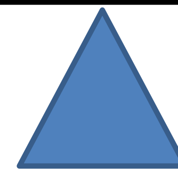
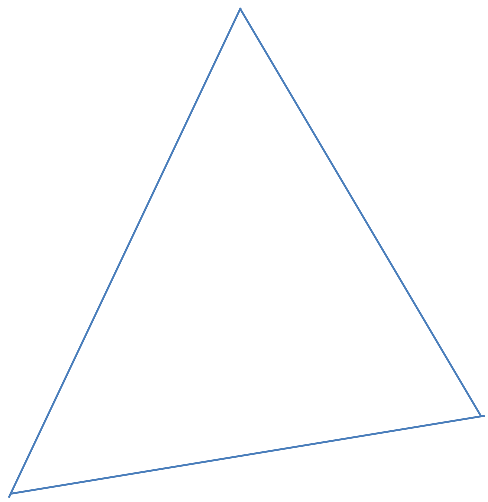
Section 5.4

Definition of a Midsegment	-The segment connecting the ____________________________ of the two sides of the triangle. 

PROVING THE TRIANGLE MIDSEGMENT THM.

- Construct the midpoints of two sides And connect them
- Measure the length of the midsegment and compare it to the length of the base



Triangle Midsegment Theorem	The Midsegment of a triangle is: A.) _______________________ to the third side B.) ____________________________________ of the third side

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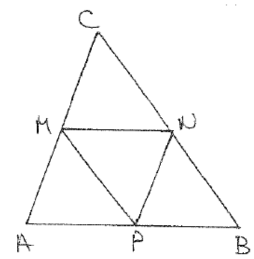
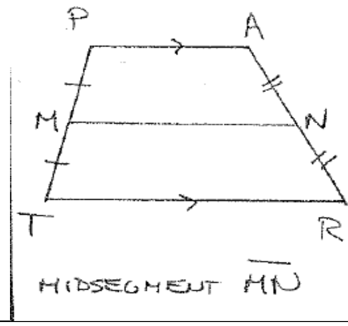
Three Midsegment Theorem	The three midsegments of a triangle divide the triangle into ______________________ triangles. 
Midsegment of a trapezoid	The segment connecting the midpoints of the two ________ of the trapezoid 
Trapezoid Midsegment Theorem	The midsegment of a trapezoid is: A.) _______________ to the bases B.) Has length equal to the _________________ of the lengths of the bases.

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Section 5.5 - Investigation	
Quadrilateral Hierarchy	-Shows relationships among the various types of quadrilaterals - ______________________________ works up the hierarchy - ___________________________ work down the hierarchy Example: A rectangle is also : Properties of trapezoids also apply to:
<u>Properties of Parallelograms:</u>	
Parallelogram ___________________________ Angles Theorem	The consecutive angle of a parallelogram are ________________________________ Made possible by: ____
Parallelogram ____________________________ Theorem	Both Pairs of opposite sides of a parallelogram are ____________________________.
Parallelogram ____________________________ Theorem	Both Pairs of opposite angles of a parallelogram are ____________________________.
Parallelogram ____________________________ Theorem	The diagonals of a parallelogram _________________ each other.

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<table>
<tr>
<td>Vector</td>
<td>

A quantity with both ______________________ and ________________________
Represented by arrows

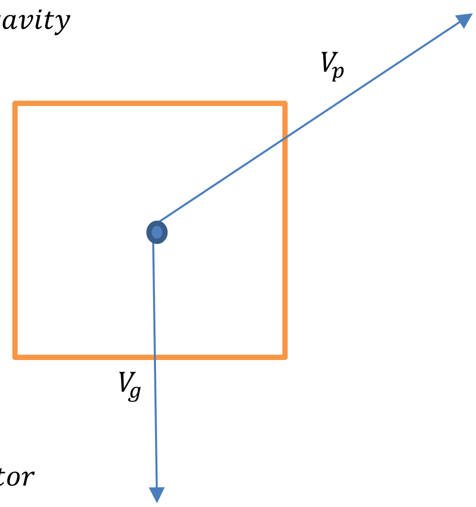
Direction: ____
Magnitude: ____

Used in physics to represent forces, velocity, or acceleration

</td>
</tr>
<tr>
<td>Resultant Vector</td>
<td>

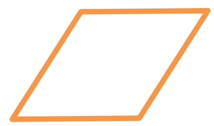
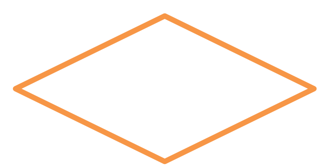
A single vector representing the effect of two forces put together
Finding vector sum

Draw a parallelogram using the vectors as sides
Resultant vector is the ______________________ of this parallelogram drawn from the vectors’ tails.

<u>Example:</u>
2 forces acting on an object
$V_p = Force\ due\ to\ pulling$
$V_g = Force\ due\ to\ gravity$


$V_r = Resultant\ Vector$
</td>
</tr>
</table>

H.Geometry – Chapter 5– Definition Sheet

Section 5.6	
Properties of Rhombuses:	
Definition of a rhombus	A parallelogram with __________________________ sides. Belongs to : ___________, ____________________________, _____________________ **(1) Because a rhombus is a :** ___________: Diagonals are perpendicular (_____________________________) __________________________: Diagonals bisect each other. (___________________ __________________________)
Rhombus Diagonal Theorem	The diagonals of a rhombus are _________________________________ of each other.  **(2) Because a rhombus is a :** ___________: Diagonal connecting the vertex angles is the angle bisector of the vertex angles (_________________________________) and a rhombus has ____.
Rhombus Angle Bisector Theorem.	The diagonals of a rhombus ____________________ the angles of the rhombus  **<u>Question:</u>** What is true about the 4 triangles formed by the 2 diagonals of the rhombus?

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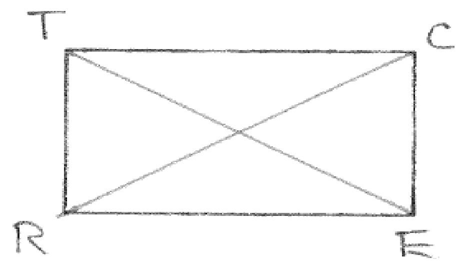
<u>Properties of Rectangles:</u>	
Definition of rectangle	A parallelogram with ____ (making each ________________) Belongs to: __________________________, _______________________________, __________________________ (_______________________________) **(1) Because a rectangle is a :** ____________________________: Diagonals are perpendicular bisectors of each other (____) ____________________________: Diagonals are congruent. (____)
Square Diagonal Theorem	The diagonals of a rectangle are ______________________________ and _____________________________________

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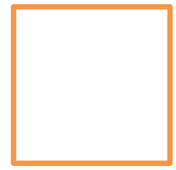
Properties of Squares:	
Definition of Square	A quadrilateral that is equilateral and equiangular Belongs to: ____
	(1) Because a square is a : ____________________________: Diagonals are congruent (____) ____________________________: Diagonals are perpendicular (____) ____________________________: Diagonals are bisectors of each other. (____)
Square Diagonals Theorem	The diagonals of a square are ______________________, ______________________, and ______________________________________.

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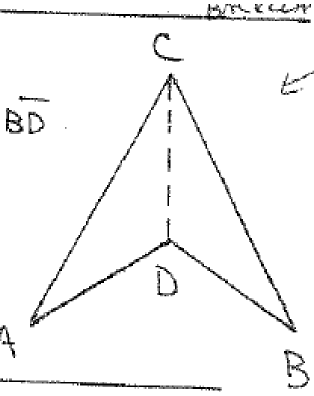
Section 5.7	
Approaches to solving a difficult proof	• Reason FORWARD from givens Or • Reason BACKWARD from given proof

EXAMPLE:

GIVEN: DART ADBC WITH $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$

PROVE: $\overline{CD}$ BISECTS $\angle ACB$



CONCLUSIONS	JUSTIFIC.
0. DART ADBC w/ $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$	
1. $\overline{CD} \cong \overline{CD}$	
2. $\triangle ADC \cong \triangle BDC$	
3. $\angle ACD \cong \angle BCD$	
4. $\overline{CD}$ BISECTS $\angle ACB$	

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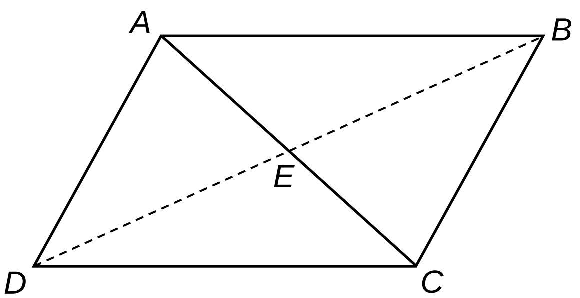
Investigation: ***Proving Properties of Parallelograms*** Lesson 5.7

Given:
ABCD is a parallelogram



Prove:

1) $\triangle ABC \cong \triangle CDA$

2) $\overline{AB} \cong \overline{CD}$
$\overline{BC} \cong \overline{DA}$

3) $\angle ABC \cong \angle CDA$

4) $\triangle DAB \cong \triangle BCD$

5) $\angle DAB \cong \angle BCD$

6) $\triangle AED \cong \triangle CEB$

7) $\overline{AE} \cong \overline{CE}$
$\overline{DE} \cong \overline{BE}$

Conclusions	Justifications

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Directions: Put a checkmark in each box if the particular quadrilateral always has the given property.

Quadrilateral Properties	Trapezoid	Parallelogram	Kite	Isosceles Trapezoid	Rhombus	Rectangle	Square
Opposite ∠'s ≅							
Vertex ∠'s ≅							
Non-vertex ∠'s ≅							
Base ∠'s ≅							
Consecutive ∠'s supplementary							
Equiangular							
Equilateral							
Diagonals bisect vertex ∠'s							
Diagonals bisect non-vertex ∠'s							
Diagonals ≅							
Diagonals bisect each other							
Diagonals ⊥							
One pair of // sides							
Two pairs of // sides							
Legs ≅							
Bases ≅							
Opposite sides ≅							
Consecutive sides ≅							

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