H.Geometry – Chapter 5– Definition Sheet

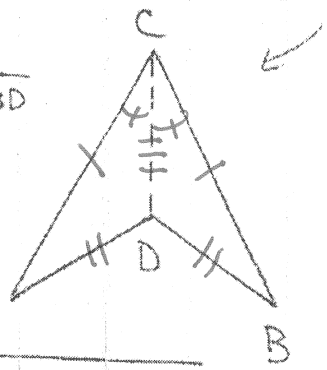
Section 5.7

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/ $\overline{AC} \cong \overline{BC}$, $\overline{AD} \cong \overline{BD}$	0. Given
1. $\overline{CD} \cong \overline{CD}$	1. Reflexive
2. $\triangle ADC \cong \triangle BDC$	2. SSS$\cong$
3. $\angle ACD \cong \angle BCD$	3. CPCTC
4. $\overline{CD}$ BISECTS $\angle ACB$	4. $\overline{CD}$ bisects $\angle ACB$

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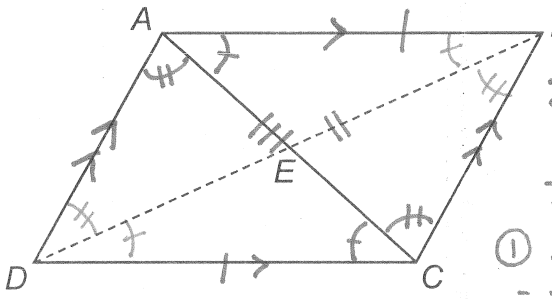
Investigation: ***Proving Properties of Parallelograms*** Lesson 5.7

Given:

ABCD is a parallelogram



Prove:

✓ 1) $\Delta ABC \cong \Delta CDA$

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

✓ 3) $\angle ABC \cong \angle CDA$

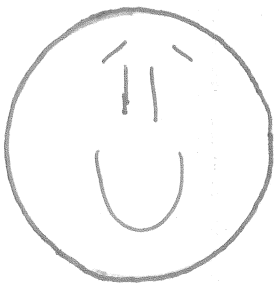
✓ 4) $\Delta DAB \cong \Delta BCD$

✓ 5) $\angle DAB \cong \angle BCD$

✓ 6) $\Delta AED \cong \Delta CEB$

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

	Conclusions	Justifications
	0. ABCD is a parallelogram	0. Given
	1. $\overline{AB} \parallel \overline{DC}$; $\overline{AD} \parallel \overline{BC}$	1. Defn. of parallelogram
	2. $\angle BAC \cong \angle ACD$, $\angle DAC \cong \angle ACB$	2. AIA Thm.
	3. $\overline{AC} \cong \overline{AC}$	3. Reflexive
①	4. $\Delta ACD \cong \Delta CAB$	4. ASA $\cong$
②	5. $\overline{AB} \cong \overline{CD}$, $\overline{AD} \cong \overline{BC}$	5. CPCTC (4)
③	6. $\angle ABC \cong \angle CDA$	6. CPCTC (4)
④	7. $\overline{DB} \cong \overline{DB}$	7. Reflexive
	8. $\Delta DAB \cong \Delta BCD$	8. SSS $\cong$ (5,7)
⑤	9. $\angle DAB \cong \angle BCD$	9. CPCTC
⑥	10. $\angle AED \cong \angle BEC$	10. Vertical Angle Thm
	11. $\Delta AED \cong \Delta CEB$	11. SAA $\cong$ (2,5,10)
⑦	12. $\overline{AE} \cong \overline{CE}$, $\overline{DE} \cong \overline{BE}$	12. CPCTC



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

Quadrilateral Properties	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 (only)	Two pairs of // sides	Legs ≅	Bases ≅	Opposite sides ≅	Consecutive sides ≅
Trapezoid	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Parallelogram	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✓	✓	✓	✓	✗
Kite	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓
Isosceles Trapezoid	✗	✗	✗	✓	✓	✗	✗	✗	✗	✓	✗	✗	✓	✗	✓	✓	✓	✗
Rhombus	✓	✗	✓	✗	✓	✗	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✓
Rectangle	✓	✗	✓	✓	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✓	✓	✗
Square	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓