

Geometry CC - Unit 6  
Lesson 5: Indirect Proofs - Day 2  
M1 L22-27

Homework Answers 7-4 (day 1)

1. Given:  $\overline{BA} \cong \overline{BC}$   
Prove:  $\overline{AD} \cong \overline{DC}$

opp. is CPCTC  
opp. is the assumption

S	R
① $\overline{BA} \cong \overline{BC}$	① Given
② $\angle 1 \neq \angle 2$	② Given
③ $\overline{AD} \cong \overline{DC}$	③ Assumption
④ $\overline{DB} \cong \overline{DB}$	④ Reflexive Property
⑤ $\triangle BAD \cong \triangle BCD$	⑤ SSS $\cong$ SSS
⑥ $\angle 1 \cong \angle 2$	⑥ CPCTC
⑦ $\overline{AD} \not\cong \overline{DC}$	⑦ Contradiction in steps 2 & 6

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2. Given:  $\overline{AC} \cong \overline{DF}$   
 $\angle C \cong \angle F$   
 $\angle A \cong \angle E$   
Prove:  $\overline{CB} \cong \overline{FE}$

opp. is the CPCTC  
opp. is the Assumption

S	R
① $\overline{AC} \cong \overline{DF}$	① Given
② $\angle C \cong \angle F$	② Given
③ $\angle A \cong \angle E$	③ Given
④ $\overline{CB} \cong \overline{FE}$	④ Assumption
⑤ $\triangle ABC \cong \triangle DEF$	⑤ SAS $\cong$ SAS
⑥ $\overline{CB} \cong \overline{FE}$	⑥ CPCTC
⑦ $\overline{CB} \not\cong \overline{FE}$	⑦ Contradiction in steps 3 & 6

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1. Given:  $\triangle ABC$ ,  $\overline{CBTD}$ ,  $\overline{AB} \perp \overline{CD}$   
Write an indirect proof to show that  $\overline{AT}$  is not perpendicular to  $\overline{CD}$ .

Statement	Reason
① $\triangle ABC$ , $\overline{CBTD}$ , $\overline{AB} \perp \overline{CD}$	① Given
② $\angle ABT$ is a right angle	② $\perp$ lines form right angles
③ $\triangle ABC$ is a right triangle	③ a right triangle has 1 right angle
④ $\overline{AT} \perp \overline{CD}$	④ Assumption
⑤ $\angle ATB$ is a right angle	⑤ $\perp$ lines form right angles
⑥ $\overline{AT}$ is not perpendicular to $\overline{CD}$	⑥ a triangle cannot have 2 right angles

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2. Given:  $\overline{BC} \cong \overline{BD}$   
 $\angle C \cong \angle D$   
Prove:  $\angle CBA \cong \angle DBA$

Statement	Reason
① $\overline{BC} \cong \overline{BD}$	① Given
② $\angle C \cong \angle D$	② Given
③ $\angle CBA \cong \angle DBA$	③ Assumption
④ $\overline{AB} \cong \overline{AB}$	④ Reflexive Property
⑤ $\triangle ABC \cong \triangle ABD$	⑤ SAS $\cong$ SAS
⑥ $\angle C \cong \angle D$	⑥ CPCTC
⑦ $\angle CBA \not\cong \angle DBA$	⑦ Contradiction steps 2 & 6

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3. Given:  $\overline{AD}$  bisects  $\angle CAB$   
 $\overline{CD} \cong \overline{DB}$   
Prove:  $\triangle CAB$  is not isosceles

Statement	Reason
① $\overline{AD}$ bisects $\angle CAB$	① Given
② $\overline{CD} \cong \overline{DB}$	② Given
③ $\triangle CAD \cong \triangle CBD$	③ Assumption
④ $\angle 1 \cong \angle 2$	④ An angle bisector divides an angle into 2 equal angles
⑤ $\overline{AC} \cong \overline{CB}$	⑤ An isosceles triangle has 2 equal sides
⑥ $\overline{AD} \cong \overline{AD}$	⑥ Reflexive Prop.
⑦ $\triangle CAD \cong \triangle CBD$	⑦ SAS $\cong$ SAS
⑧ $\overline{CD} \cong \overline{DB}$	⑧ CPCTC
⑨ $\triangle CAB$ is not isosceles	⑨ Contradiction steps 2 & 8

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4. Given:  $\overline{AB} \cong \overline{BC}$   
 $\overline{AD} \cong \overline{DC}$   
Prove:  $\overline{DB} \perp \overline{AC}$

Statement	Reason
① $\overline{AB} \cong \overline{BC}$	① Given
② $\overline{AD} \cong \overline{DC}$	② Given
③ $\overline{DB} \perp \overline{AC}$	③ Assumption
④ $\angle 1 \cong \angle 2$	④ $\perp$ lines form right angles
⑤ $\angle 1 \cong \angle 2$	⑤ All right angles are congruent
⑥ $\overline{BD} \cong \overline{BD}$	⑥ Reflexive Prop.
⑦ $\triangle ABD \cong \triangle CBD$	⑦ SAS $\cong$ SAS
⑧ $\overline{AD} \cong \overline{DC}$	⑧ CPCTC
⑨ $\overline{DB} \not\perp \overline{AC}$	⑨ Contradiction steps 2 & 8

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