

Geometry CC - Unit 6  
 Lesson 4: Indirect Proofs  
 M1 L22-27

**Homework:**

Dec 2-3:58 PM

**Indirect Proofs:** Assume what you need to prove is *false* and then show a contradiction.

We know an **Indirect Proof** is needed when we see the word 'not' or  $\neq$ .

1. Given:  $\angle A \cong \angle D$ ,  
 $\angle B \cong \angle E$ ,  
 $\angle C \cong \angle F$   
 Prove:  $\overline{AB} \cong \overline{DE}$

*assume opposite*

Statement	Reason
1) $\angle A \cong \angle D$	1) Given
2) $\angle B \cong \angle E$	2) Given
3) $\angle C \cong \angle F$	3) Given
4) $\overline{AB} \cong \overline{DE}$	4) Assumption
5) $\triangle ABC \cong \triangle DEF$	5) ASA $\cong$ ASA
6) $\angle C \cong \angle F$	6) CPCTC
7) $\overline{AB} \cong \overline{DE}$	7) Contradiction in steps 3 and 6

Dec 2-3:56 PM

2. Given:  $\overline{AB} \cong \overline{AC}$   
 $\overline{BD} \cong \overline{DC}$   
 Prove:  $\angle 1 \cong \angle 2$

Statement	Reason
1) $\overline{AB} \cong \overline{AC}$	1) Given
2) $\overline{BD} \cong \overline{DC}$	2) Given
3) $\angle 1 \cong \angle 2$	3) Assumption
4) $\overline{AD} \cong \overline{AD}$	4) Reflexive Property
5) $\triangle BAD \cong \triangle CAD$	5) SAS $\cong$ SAS
6) $\overline{BD} \cong \overline{DC}$	6) CPCTC
7) $\angle 1 \cong \angle 2$	7) Contradiction in Steps 2 and 6

Dec 2-3:56 PM

3. Given:  $\overline{BD} \cong \overline{DC}$   
 $\angle ADB \cong \angle ADC$   
 Prove:  $\triangle BAC$  is not isosceles with vertex A

Statement	Reason
1) $\overline{BD} \cong \overline{DC}$	1) Given
2) $\angle ADB \cong \angle ADC$	2) Given
3) $\triangle BAC$ is isoc. with vertex A	3) Assumption
4) $\overline{AC} \cong \overline{AB}$	4) An isoc. $\triangle$ has 2 $\cong$ sides
5) $\overline{AD} \cong \overline{AD}$	5) Reflexive Property
6) $\triangle ACD \cong \triangle ABD$	6) SSS $\cong$ SSS
7) $\angle ADB \cong \angle ADC$	7) CPCTC
8) $\triangle BAC$ is not isosceles with vertex A	8) Contradiction in steps 2 and 7

Dec 2-3:56 PM

4. Given:  $\angle ADB \cong \angle CDB$ ,  
 $\overline{AB} \cong \overline{CB}$   
 Prove:  $\overline{DB}$  does not bisect  $\angle ABC$

Statement	Reason
1) $\angle ADB \cong \angle CDB$	1) Given
2) $\overline{AB} \cong \overline{CB}$	2) Given
3) $\overline{DB}$ does bisect $\angle ABC$	3) Assumption
4) $\angle 1 \cong \angle 2$	4) Def. of an $\angle$ bisector
5) $\overline{DB} \cong \overline{DB}$	5) Reflexive Property
6) $\triangle ADB \cong \triangle CDB$	6) ASA $\cong$ ASA
7) $\overline{AB} \cong \overline{CB}$	7) CPCTC
8) $\overline{DB}$ does not bisect $\angle ABC$	8) Contradiction in steps 2 and 7

Dec 2-3:57 PM

5. Given:  $\overline{AD}$  is a median in  $\triangle ABC$ ,  
 $\angle 1 \cong \angle 2$   
 Prove:  $\triangle CAB$  is not isosceles

STATEMENTS	REASONS
1. $\overline{AD}$ is a median in $\triangle ABC$	1. Given
2. $\angle 1 \cong \angle 2$	2. Given
3. $\triangle CAB$ is isosceles	3. Assumption
4. $D$ is a midpoint	4. Definition of a median
5. $\overline{CD} \cong \overline{BD}$	5. Definition of a midpoint
6. $\overline{AC} \cong \overline{AB}$	6. An isosceles $\triangle$ has 2 $\cong$ sides.
7. $\overline{AD} \cong \overline{AD}$	7. Reflexive Property
8. $\triangle ADC \cong \triangle ADB$	8. SSS $\cong$ SSS
9. $\angle 1 \cong \angle 2$	9. CPCTC
10. $\triangle CAB$ is not isosceles	10. Contradiction in steps 2 and 9.

Dec 2-3:57 PM