

**Indirect Proofs** Name \_\_\_\_\_

Each of the following proofs is incomplete, as certain statements and/or reasons are missing. Your task is to fill in the missing statements and/or reasons.

**1.**

Given:  $\triangle ABC$  where  $\overline{AB} \not\cong \overline{BC}$   
 $\overline{BD}$  is a median  
 Prove:  $\overline{BD} \perp \overline{AC}$

STATEMENTS	REASONS
1. $\triangle ABC$ where $\overline{AB} \not\cong \overline{BC}$ ; $\overline{BD}$ is a median	1. Given
2. Assume $\overline{BD} \perp \overline{AC}$	2. Assumption
3. $D$ is the midpoint of $\overline{AC}$	3. Def. of a median.
4. $\overline{AD} \cong \overline{DC}$	4. Def. of a midpoint
5. $\overline{BD} \cong \overline{BD}$	5. Reflexive Prop.
6. $\angle ADB, \angle BDC$ right angles	6. Lines form rt angles
7. $\angle ADB \cong \angle BDC$	7. All right angles are congruent.
8. $\triangle ADB \cong \triangle CDB$	8. SAS $\cong$ SAS
9. $\overline{AB} \cong \overline{BC}$	9. CPCTC
10. $\overline{BD} \perp \overline{AC}$	10. Contradiction steps 1 & 9.

All Rights Reserved © MathBits.com

**2.**

Given:  $\triangle ABC$  is scalene  
 altitudes  $\overline{AE}$  and  $\overline{CD}$   
 Prove:  $\overline{AE} \not\cong \overline{CD}$

STATEMENTS	REASONS
1. $\triangle ABC$ is scalene; altitudes $\overline{AE}$ and $\overline{CD}$	1.
2.	2. Assumption leading to a contradiction.
3. $\overline{AE} \perp \overline{BC}$ ; $\overline{CD} \perp \overline{AB}$	3.
4.	4. Perpendicular lines meet to form right angles.
5.	5.
6.	6. Reflexive Property
7. $\triangle BDC \cong \triangle AEB$	7.
8. $\overline{AB} \cong \overline{BC}$	8.
9.	9.
10. $\overline{AE} \not\cong \overline{CD}$	10.

All Rights Reserved © MathBits.com

**3.**

Given:  $\triangle ABC$  where  $\angle 1 \cong \angle 2$   
 $\overline{AD}$  does not bisect  $\angle CAB$   
 Prove:  $\overline{AB} \not\cong \overline{AC}$

STATEMENTS	REASONS
1. $\triangle ABC$ where $\angle 1 \cong \angle 2$ $\overline{AD}$ does not bisect $\angle CAB$	1. Given
2.	2. Assumption leading to a contradiction.
3.	3. If two angles of a triangle are congruent, the sides opposite them are congruent.
4.	4. Reflexive property.
5.	5. SSS
6.	6. CPCTC
7.	7. An angle bisector is a ray whose endpoint is the vertex of the angle and which divides the angle into two congruent angles.
8.	8. Contradiction Steps 7 and 1

All Rights Reserved © MathBits.com

**4.**

Given:  $\overline{ME} \not\cong \overline{TE}$  and  $\overline{MH} \parallel \overline{AT}$   
 Prove:  $\angle 1 \not\cong \angle 2$

STATEMENTS	REASONS
1. $\overline{ME} \not\cong \overline{TE}$ and $\overline{MH} \parallel \overline{AT}$	1. Given
2.	2. Assumption leading to a contradiction.
3. $\angle 2 \cong \angle 3$	3.
4.	4. Transitive property.
5. $\overline{MH} \cong \overline{AT}$	5.
6. $\angle 1 \not\cong \angle 2$	6.

All Rights Reserved © MathBits.com