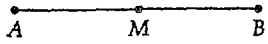
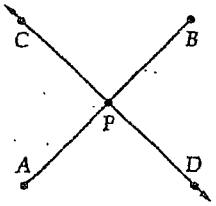
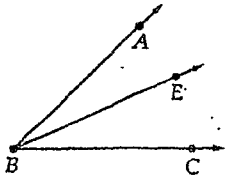
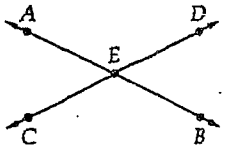
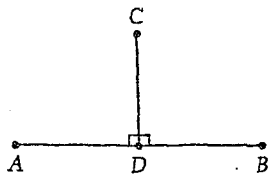
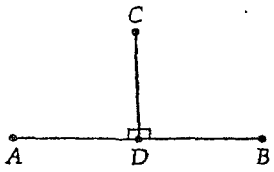
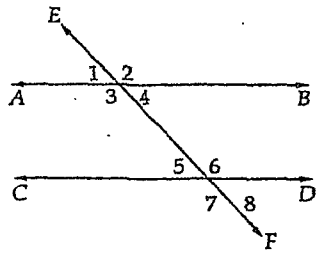
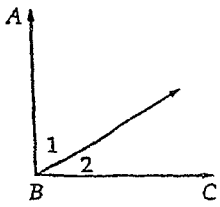
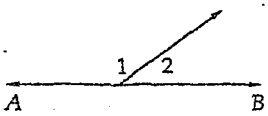
2 Helpful Hints for Proofs

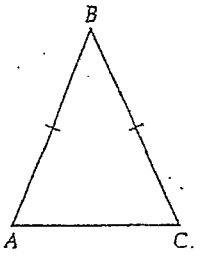
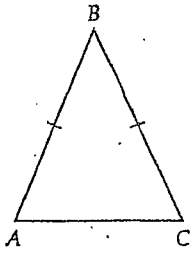
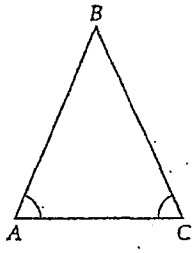
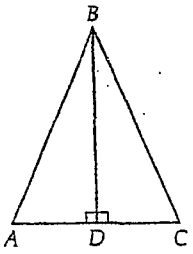
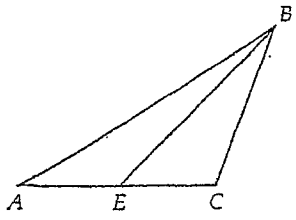
Helpful Hints for Direct Proofs

One of the more difficult concepts in formulating a proof is determining how to use the given information.

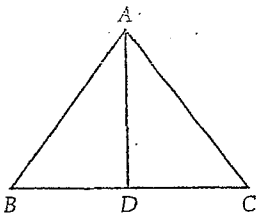
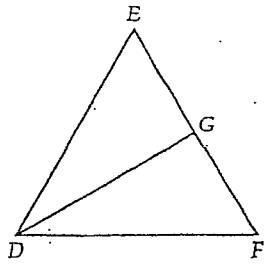
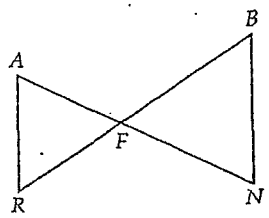
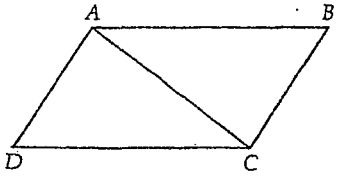
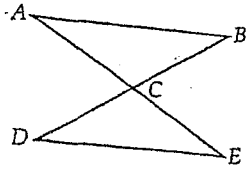
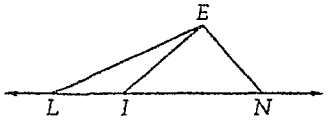
The table below is designed to help you over this hurdle.

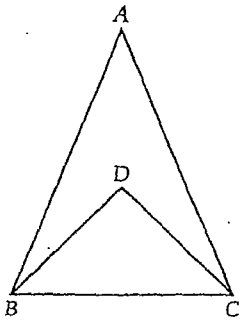
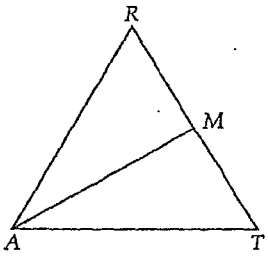
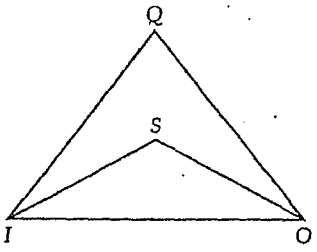
If you are given:	You can conclude:
M is the midpoint of $\overline{AB}$. 	
$\overleftrightarrow{CD}$ bisects $\overline{AB}$ at P. 	
$\overrightarrow{BE}$ bisects $\angle ABC$. 	
$\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. 	

If you are given:	You can conclude:
$\overline{CD} \perp \overline{AB}$ at D. 	
$\overline{CD}$ is the perpendicular bisector of $\overline{AB}$. 	
$\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$ and is cut by transversal $\overleftrightarrow{EF}$. 	
$\angle ABC$ is a right angle. 	
$\overleftrightarrow{AB}$ is a straight line. 	

If you are given:	You can conclude:
Triangle ABC, with $\overline{BA} \cong \overline{BC}$. 	
Triangle ABC is isosceles, with $\overline{BA} \cong \overline{BC}$. 	
Triangle ABC, with $\angle A \cong \angle C$. 	
Triangle ABC, $\overline{BD}$ the altitude. 	
Triangle ABC, with $\overline{BE}$ the median to AC. 	

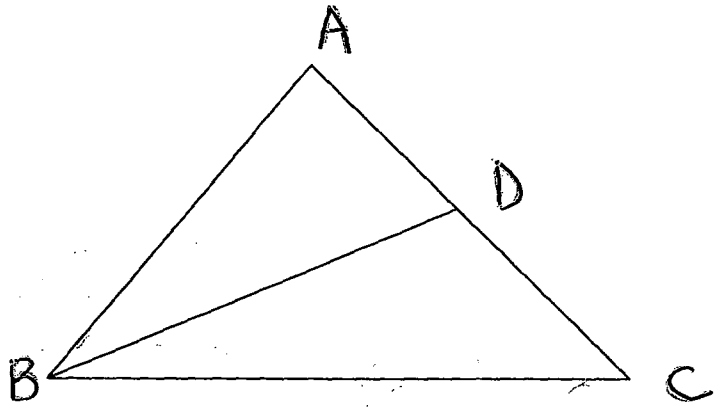
In 2–10, write an appropriate statement and reason, given the following information.

Given	Statement	Reason
2. Triangle ABC, with $\overline{AD} \perp \overline{BC}$. 		
3. Triangle DEF with $\overline{DG}$ the bisector of $\angle EDF$. 		
4. $\overline{AN}$ and $\overline{RB}$ intersect at F. 		
5. Quadrilateral $ABCD$, $\overline{AD} \parallel \overline{BC}$. 		
6. Triangles ABC and DEC, with $\overline{AE}$ the bisector of $\overline{DB}$. 		
7. $\overleftrightarrow{LIN}$ is a straight line. 		

Given	Statement	Reason
8. Triangles ABC and DBC, $\overline{DB} \cong \overline{DC}$. 		
9. Triangle ART, $\overline{AM}$ is the median to $\overline{RT}$. 		
10. Given isoceles triangle ISO, with $\overline{IS} \cong \overline{OS}$. 		

Name _____ Geometry

Directions: Write a statement and reason for each given statement. The picture is not drawn to scale!



1. Given: $\overline{BD}$ bisects $\angle ABC$
   Statement:

   Reason:

2. Given: $\overline{BD}$ bisects $\overline{AC}$
   Statement:

   Reason:

3. Given: $\overline{BD} \perp \overline{AC}$
   Statement:

   Reason:

4. D is the midpoint of $\overline{AC}$
   Statement:

   Reason:

5. $\overline{BD}$ is the median to side $\overline{AC}$
   Statement:

   Reason:

6. $\overline{BD}$ is an altitude
   Statement:

   Reason:

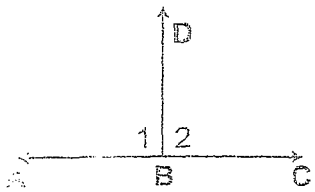
Name: _____ Date _____

Geometry P.d. _____ Practice w/Proofs

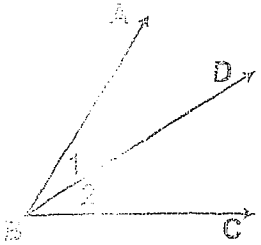
Questions 1 through 11 refer to the following:

Supply the missing reason(s) for the given proof.

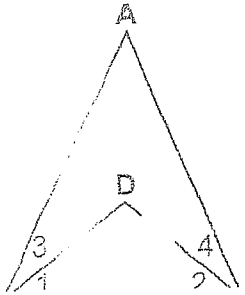
STATEMENTS	REASONS
(1) C is the midpoint of $\overline{AB}$.	(1) Given
(2) $\overline{AC} \cong \overline{CB}$	(2)



STATEMENTS	REASONS
(1) $\angle 2$ is a right angle.	(1) Given
(2) $\overleftrightarrow{AC} \perp \overrightarrow{BD}$	(2)

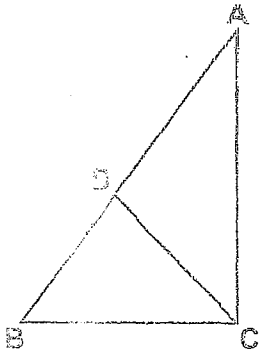


STATEMENTS	REASONS
(1) $\overrightarrow{BD}$ bisects $\angle ABC$	(1) Given
(2) $\angle 1 \cong \angle 2$	(2)



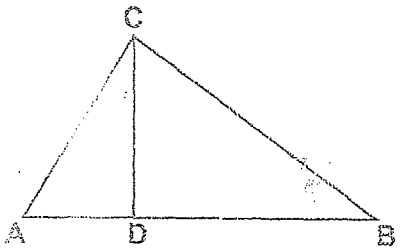
STATEMENTS	REASONS
(1) $m\angle ABC = m\angle ACB$ $m\angle 3 = m\angle 4$	(1) Given
(2) $m\angle 1 \cong m\angle 2$	(2)

5)



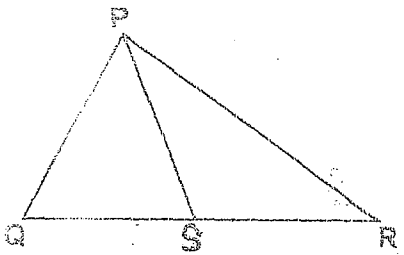
STATEMENTS	REASONS
(1) AD = DC DC = DB	(1) Given
(2) AD = DB	(2)

6)



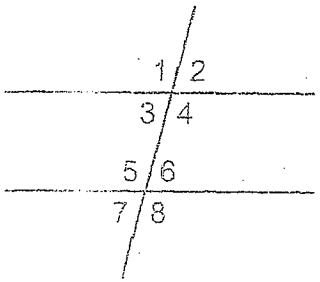
STATEMENTS	REASONS
(1) $\overline{CD}$ is the altitude to $\overline{AB}$.	(1) Given
(2) $\overline{CD} \perp \overline{AB}$	(2)

7)



STATEMENTS	REASONS
(1) $\overline{PS}$ is the median to $\overline{QR}$.	(1) Given
(2) S is the midpoint of $\overline{QR}$	(2)

8)



STATEMENTS	REASONS
(1) $m\angle 1 + m\angle 6 = 180^\circ$	(1) Given
(2) $m\angle 6 = m\angle 7$	(2)
(3) $m\angle 1 + m\angle 7 = 180^\circ$	(3)