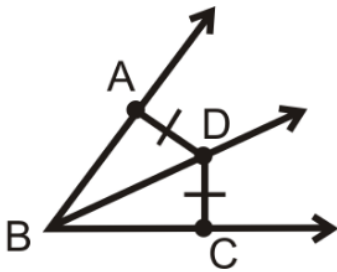# Another proof to fill in!

Angle Bisector Theorem Converse: If a point is in the interior of an angle and equidistant from the sides, then it lies on the bisector of the angle.

9. Fill in the blanks in the Angle Bisector Theorem Converse.

Premise: _____

Construction: $BA \perp AD$ and $BC \perp DC$

<u>Prove:</u> $\overrightarrow{BD}$ bisects $\angle ABC$

Statement	Reason	Steps
1. AD and DC are the distances from D to BA and BC	The shortest distance from a point to a line is perpendicular.	C
2. $AD = DC$		
3. $\angle DAB$ and $\angle DCB$ are right angles	Definition of perp. lines	
4. $\angle DAB \cong \angle DCB$		
5. $\overline{BD} \cong \overline{BD}$		
6. $\triangle ABD \cong \triangle CBD$		
7.	CPCTC	
8. $\overrightarrow{BD}$ bisects $\angle ABC$		

Do this one yourself!

Prove that in an isosceles triangle, two of the angles are congruent.

Remember that the definition of an isosceles triangle is a triangle where two sides are congruent!

Begin by drawing a picture of your triangle and marking what you know about it. Then label all your points. Now you're ready to write down your premise and conclusion!

Premise:

Conclusion:

Any time you're asked to prove the congruence of two line segments or angles, you should look for two triangles where these parts are corresponding. Then, you just need to show that the two triangles are congruent. Is there a line you might want to construct? Draw it in!

Construction:

Keep in mind the triangle congruence theorems, as well as the reflexive property of congruence!

Diagram   **Two-column proof:**

Statement   *Reason*   *Steps*