Ch 4 - Congruence

Def: A polygon is a connected set of at least three line segments in the same plane such that each segment intersects exactly two others, one at each endpoint.

The line segments are the sides of the polygon, and the endpoints are its vertices. The number of sides and vertices is always the same, and the polygon is referred to as an "*n*-gon" if it has *n* sides and *n* vertices.

Def: Two triangles are congruent iff there is a correspondence between their vertices such that all of their corresponding sides and angles are equal.

"Corresponding parts of congruent triangles are equal."

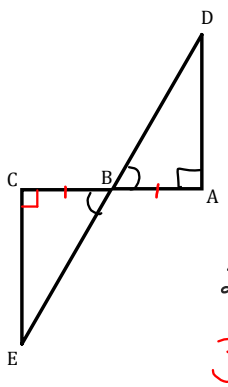
Corollary to the definition of congruent triangles: Two triangles congruent to a third triangle are congruent to each other.

Postulate 5: The ASA Postulate
If two angles and the included side of one triangle are equal to two andles and the included side of another triangle, the triangles are congruent.

Postulate 6: The SAS Postulate
If two sides and the included angle of one triangle are equal to two sides and the included angle of another triangle, the triangles are congruent.

4.4 – Congruence Proofs

Def: Corresponding parts of congruent triangles are equal.



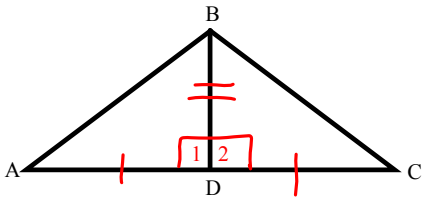
Given: $CA \perp AD, CB = BA,$
$\angle C$ *is a right angle and*
$\angle CBE$ *and* $\angle DBA$ *are vertical angles.*

Prove: $CE = AD$

Proof

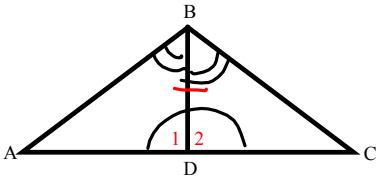
1. CA ⊥ AD	Given
2. ∠A is a right angle	Perpendicular lines form right angles
3. ∠C is a right angle	given
4. ∠C = ∠A	all right angles are equal
5. ∠CBE & ∠DBA are vertical angles	Given
6. ∠CBE = ∠DBA	vertical angles are equal
7. CB = BA	Given
8. △CBE ≅ △ABD	ASA postulate
9. CE = AD	corresponding parts of congruent △s are equal

4.4 - Congruence Proofs, cont.



Given: D is the midpoint of AC
BD AC

2. Why is AD=DC? a midpoint of a line segment divides it into 2 equal segments
3. Why are 1 and 2 right angles? perpendicular lines form right angles
4. Why is 1= 2? all right angles are equal
5. Why is BD=BD? reflexive property
6. Why is ΔABD ΔCBD? SAS
7. Why is BAD= BCD? corresponding parts of congruent triangles are equal



Given: 1= 2
ABD= CBD

9. Why is BD=BD?

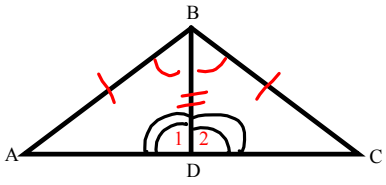
reflexive property

10. Why is ΔABD ΔCBD?

ASA

11. Why is BA=BC?

corresponding parts of congruent triangles are equal



Given: BA=BC
BD bisects ABC

13. Why is ABD= CBD?

angle bisector divides an angle into 2 equal angles

14. Why is BD=BD?

reflexivity

15. Why is ΔABD ΔCBD?

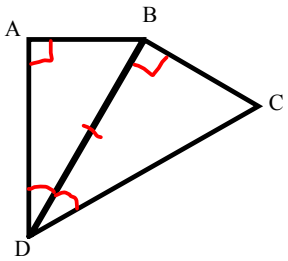
SAS

16. Why is 1= 2?

corresponding parts of congruent triangles are equal

17. If 1 and 2 are a linear pair, why is BD AC?

If angles in a linear pair are equal, their sides are perpendicular

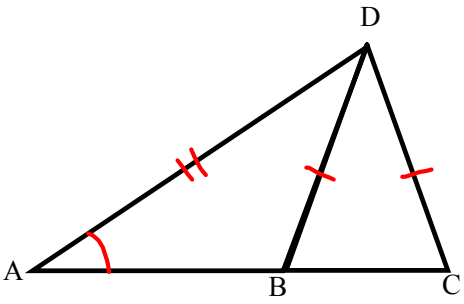


What is *wrong* with this proof?

Given: DB bisects ADC
A and DBC are right angles.
Prove: ΔADB ΔBDC

Proof:

Statements	Reasons
1. DB bisects ADC	Given.
2. ADB= BDC	If an angle is bisected, it is divided into two equal angles.
3. BD=BD	Reflexive.
4. A and DBC are right angles	Given
5. A= DBC	All right angles are equal.
6. ΔADB ΔBDC	~~ASA~~



What is *wrong* with this proof?

Given: DB=DC
Prove: AB=AC

Proof:

Statements	Reasons
1. DB=DC	Given
2. AD=AD	Reflexive
3. DAB= DAC	Reflexive
4. ΔDAB ΔDAC	~~SAS~~
5. AB=AC	Corresponding parts of congruent triangles are congruent

NOT a congruence

ASS