- Ch 4 Review Problems pp.176-180 #7-36, 48,51,52 due MONDAY 12/12

- Ch 5 Review Problems pp. 206-209 #15-50
- Ch 6 Review Problems pp. 250-254 #9-19, 33-53

4.2 – Polygons and 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.

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

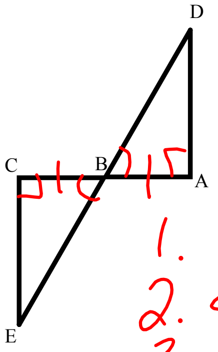
4.3 – ASA and SAS Congruence

Postulate 5: The ASA Postulate
If two angles and the included side of one triangle are equal to two angles 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.



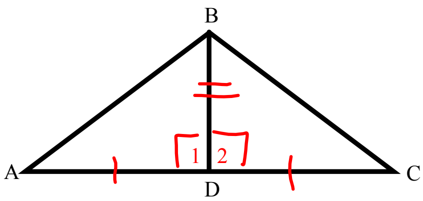
Given: $CA \perp AD, CB = BA,$
$\angle C$ *is a right angle and*
$\angle CBE$ *and* $\angle DBA$ *are vertical angles.*

Prove: $CE = AD$

Proof:

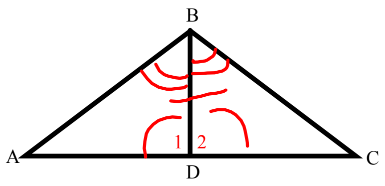
1. Given stuff	
2. $\angle A$ is a right angle	Perpendicular Lines form right angles
3. $\angle A = \angle C$	all right $\angle$'s are equal
4. $\angle CBE = \angle DBA$	vertical angles are equal
5. $\triangle CBE \cong \triangle DBA$	ASA congruence
6. $CE = AD$	corresponding parts of congruent $\triangle$'s are equal

4.4 - Congruence Proofs, cont.



Given: D is the midpoint of AC
BD AC

2. Why is AD=DC? midpoint divides a segment into 2 equal parts
3. Why are 1 and 2 right angles? perpendicular lines form right $\angle$'s
4. Why is 1= 2? all right $\angle$'s are equal
5. Why is BD=BD? reflexive property of equality
6. Why is ΔABD ΔCBD? SAS congruence
7. Why is BAD= BCD? corresponding parts of congruent $\triangle$'s are equal

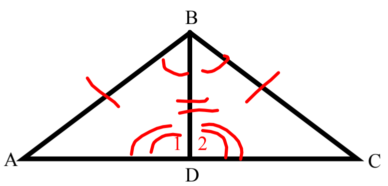


Given: 1= 2
ABD= CBD

9. Why is BD=BD?
reflexive property of equality

10. Why is ΔABD ΔCBD?
ASA congruence

11. Why is BA=BC?
corresponding parts of congruent Δs are equal



Given: BA=BC
BD bisects ABC

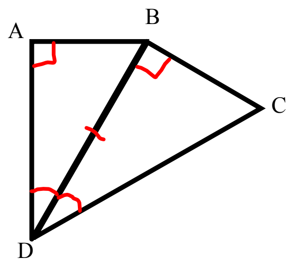
13. Why is ABD= CBD? ∠ bisector divides an angle into 2 equal angles

14. Why is BD=BD?
reflexive property of equality

15. Why is ΔABD ΔCBD?
SAS congruence

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, then their sides are perpendicular



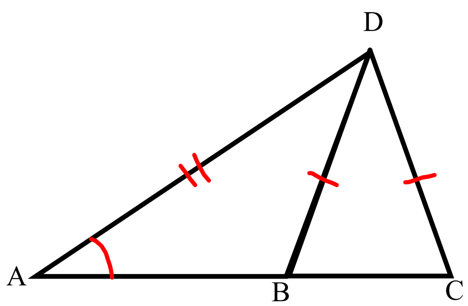
What is *wrong* with this proof?

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

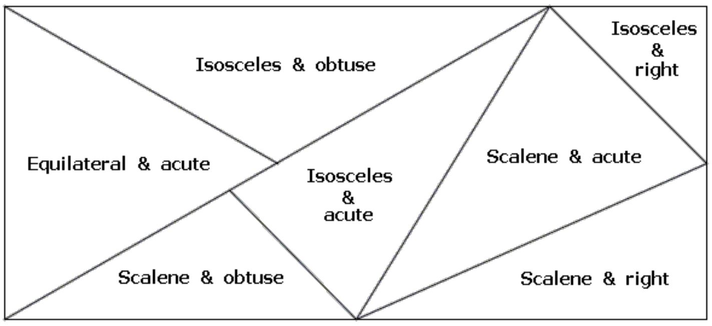
Proof:

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

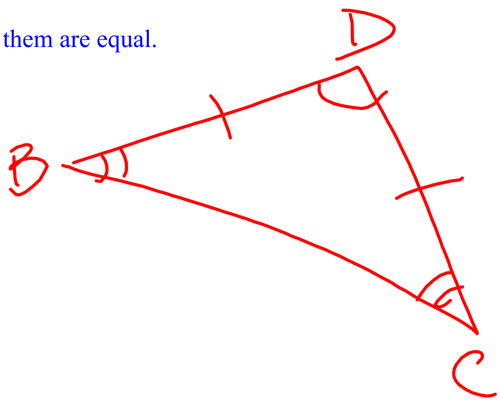
4.5 – Isosceles and Equilateral Triangles

Definitions: A triangle is

- scalene iff it has no equal sides
- isosceles iff it has at least two equal sides
- equilateral iff all of its sides are equal
- obtuse iff it has an obtuse angle
- right iff it has a right angle
- acute iff all of its angles are acute
- equiangular iff all of its angles are equal



Theorem 9: If two sides of a triangle are equal, the angles opposite them are equal.



Given: In ΔBCD, BD=CD
Prove: C= B

Proof:

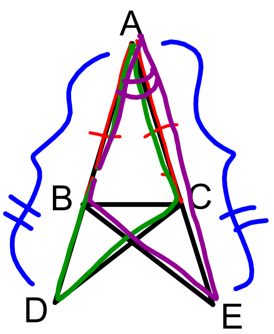
Statements	Reasons
1. In ΔBCD, BD=CD	Given
2. D= D	Reflexive
3. CD=BD	Given
4. ΔBCD ΔCBD	SAS
5. C= B	Corresponding parts of congruent triangles are equal

Theorem 10: If two angles of a triangle are equal, the sides opposite them are equal.

Corollaries to Theorems 9 and 10:

An equilateral triangle is equiangular.

An equiangular triangle is equilateral.



In ΔABC, AB=AC; AD=AE.

7. What kind of triangle is ΔABC?

isosceles

8. Why is ABC= ACB?

If 2 sides of a Δ are equal, the angles opposite them are equal

9. What angle do ΔACD and ΔABE have in common?

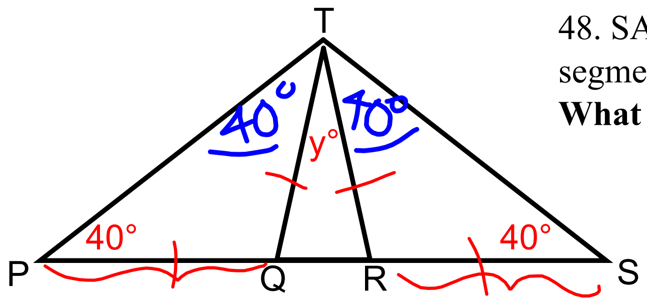
∠A (=∠A reflexive prop)

10. Why is ΔACD ΔABE?

SAS congruence

11. Why is D= E?

corresponding parts of congruent Δ's are equal



48. SAT Problem: In this figure, PS is a line segment and PQ=QT=TR=RS.
What is the value of y?

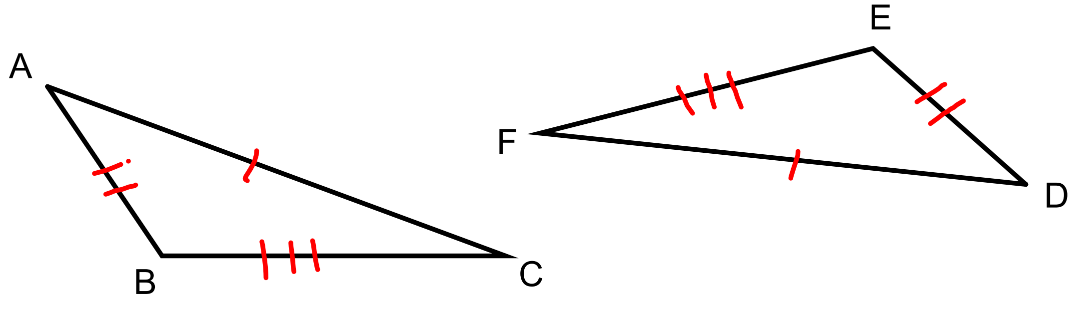
$$40^\circ + 40^\circ + 40^\circ + y + 40^\circ = 180^\circ$$

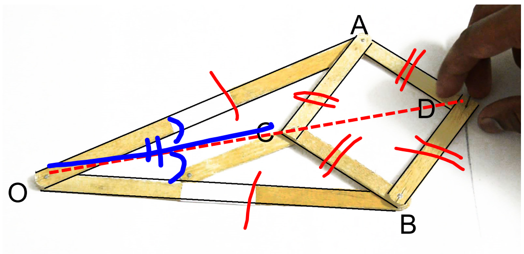
$$\boxed{y = 20^\circ}$$

4.6 – SSS Congruence

Theorem 11: The SSS Theorem

If the three sides of one triangle are equal to the three sides of another triangle, then triangles are congruent.





In this linkage, the rods can pivot about their ends so the figure can change its shape.

Given: OA=OB;
AD=DB=BC=CA

39. Why are AOC and BOC always equal? SSS
corresponding parts of ≅ △s
△AOC ≅ △BOC

40. What relation does line OC have to AOB?
bisector

41. What relation does line OD have to AOB?
bisector

42. Why must lines OC and OD be the same line?
uniqueness of angle bisector

43. What does this prove about points O, C, and D?
collinear