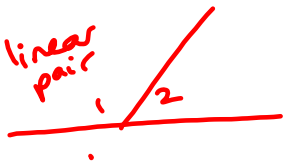
HW #1 (submitted Friday, 11/7)
- **Ch 1 Review Problems pp. 36-38**

HW #2 (submitted Friday, 11/14)
- **Ch 2 Review Problems pp. 71-74**
- **Ch 3 Review Problems pp. 124-128**
- Khan Academy exercises:
  - > "Introduction to Euclidean geometry"
  - > "Angles and intersectinglines"

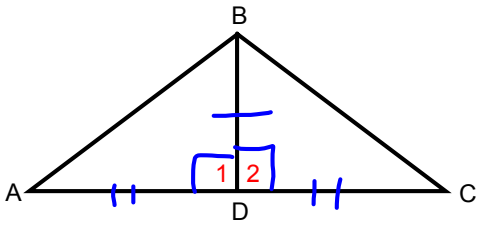
Upcoming:
Test #1 (Chapters 1-4 except compass constructions) - Wednesday, 11/19
Friday - 4.7 Constructions, Ch 5



HW #3 (**due Friday, 11/21**)
- Read Ch 4 & Ch 5
- **Ch 4 Review Problems pp.176-180**
- Khan Academy exercises: "Congruence"

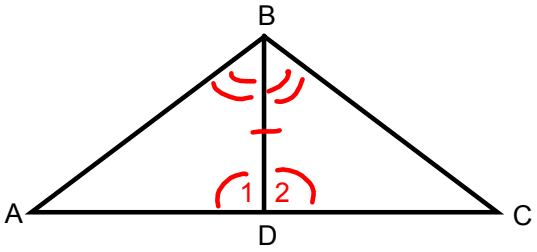
Recall:
Def: Two lines are perpendicular iff they form a right angle.
Theorem 7: Perpendicular lines form four right angles.
Corollary to the definition of a right angle: All right angles are equal.
Theorem 8: If the angles in a linear pair are equal, then their sides are perpendicular.

4.4 - Congruence Proofs, cont.



Given: D is the midpoint of AC
BD AC

2. Why is AD=DC?
midpoints (D) divide a line segment (AC) into two equal segments
3. Why are ∠1 and ∠2 right angles?
perpendiculars (BD & AC) meet at right angles
4. Why is ∠1= ∠2?
all right angles are equal
5. Why is BD=BD?
reflexive
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?

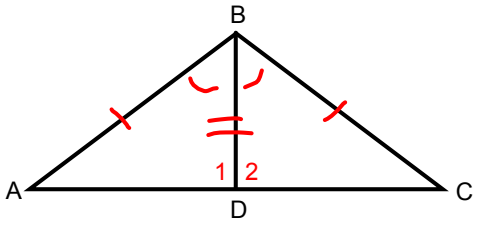
reflexive property

10. Why is ΔABD≅ΔCBD?

ASA congruence

11. Why is BA=BC?

corresponding parts of congruent triangles are equal



Given: BA=BC
BD bisects ∠ABC

13. Why is ∠ABD=∠CBD?

angle bisectors divide an angle into two equal angles

14. Why is BD=BD?

reflexive property

15. Why is ΔABD≅ΔCBD?

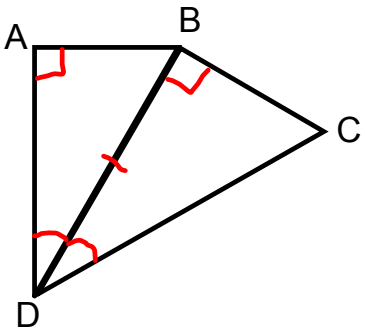
SAS congruence

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?

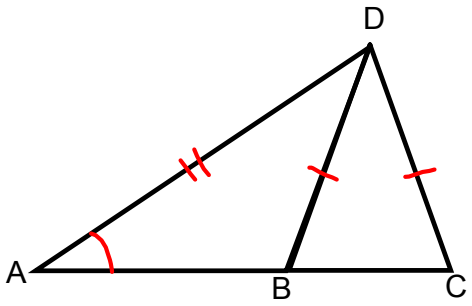
Given: DB bisects ∠ADC
∠A and ∠DBC are right angles.
Prove: ΔADB≅ΔBDC

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

corresponding parts must be equal for 2 △'s to be congruent

BD in △ABD does not correspond to BD in △BCD; AND BD is not the included side in △ABD



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

no conclusion can be drawn from a SSA (ASS) congruence

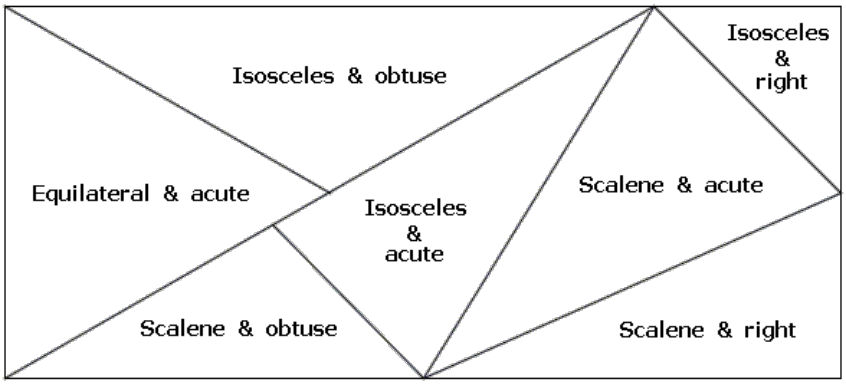
∠A

for SAS congruence, we need 2 sides and included angle to match up, and we don't have that! :)

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

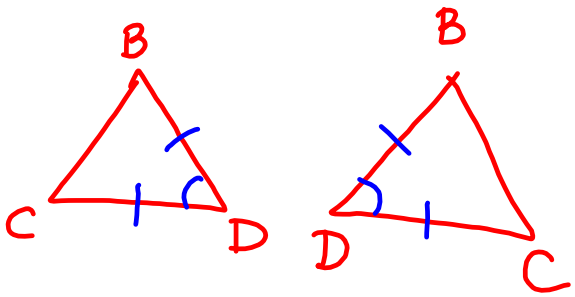


Theorem 9: If two sides of a triangle are equal, the angles opposite them are equal.

Given: In ΔBCD, BD=CD
Prove: ∠C=∠B

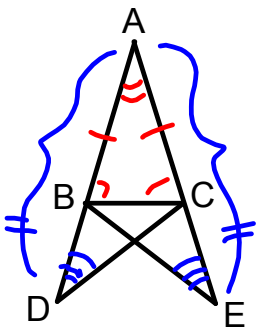
Proof:

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 two sides in a triangle are equal, then the sides opposite them are equal

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

∠A = ∠A (reflexive)

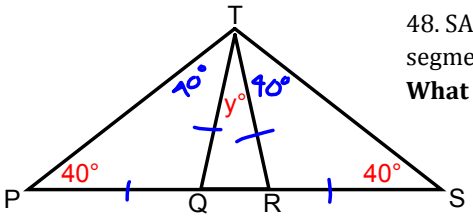
10. Why is ΔACD≅ΔABE?

SAS

∠A=∠A, AB=AC, AD=AE

11. Why is ∠D=∠E?

corresponding parts of congruent triangles are equal



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

∠PTQ = ∠STR = 40°
(if two sides in a △ are equal, the angles opposite those sides are equal)

∠P + ∠PTS + ∠S = 180°
(triangle sum theorem)

40° + 40° + y° + 40° + 40° = 180°
(substitution & Betweenness of Rays Theorem)

160° + y° = 180° (simplification)

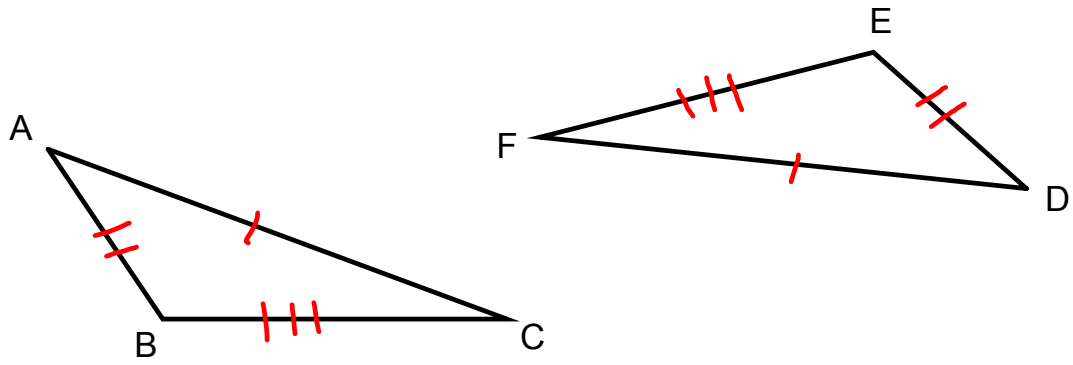
y° = 180° − 160° (subtraction)

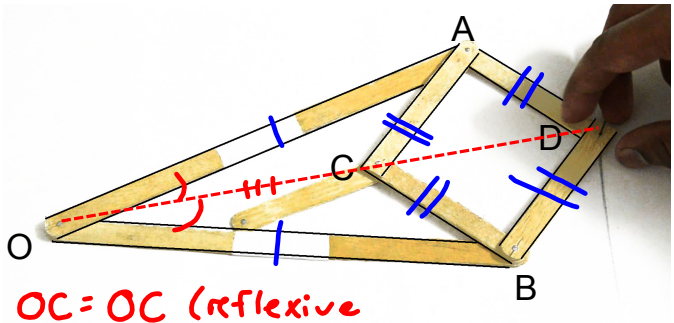
y° = 20°

4.6 – SSS Congruence

Theorem 11: The SSS Theorem Side Side Side

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?

OC = OC (reflexive)

△AOC ≅ △BOC (SSS congruence)

∠AOC = ∠BOC (corresponding parts of congruent △'s are equal)

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 bisectors

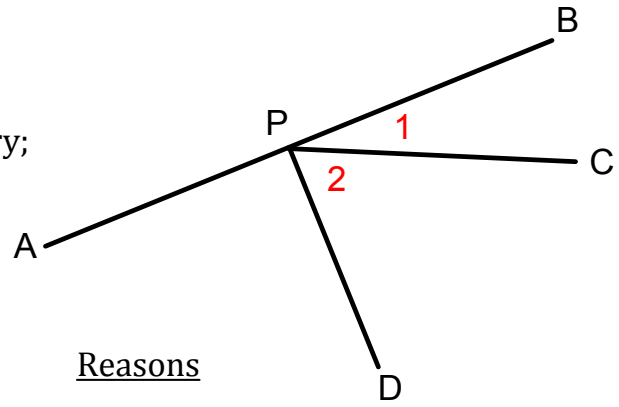
43. What does this prove about points O, C, and D?

Collinear

Review:

3.7 #44

Given: ∠1 and ∠2 are complementary;
PB-PC-PD. PC is between PB & PD
Prove: AB PD.



Statements	Reasons
1. ∠1 and ∠2 are complementary	Given
2. ∠1 + ∠2 = 90°	complements sum to 90°
3. PB-PC-PD	Given
4. ∠BPD=∠1 + ∠2	Betweenness of Rays Theorem
5. ∠BPD=90°	substitution
6. ∠BPD is a right angle	right ∠s = 90°
7. AB⊥PD	perpendicular lines meet @ right ∠s

4.4 #31

Given: ∠BGU and ∠EGL are vertical angles;
BG=GE and UG=GL

Prove: BU=LE