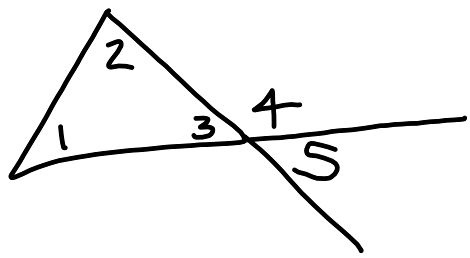
HW #4 - Due Fri, Dec 4
Ch 4 Review Problems pp.176-180 #7-36, 48,51,52

Khan Academy exercises: "Congruence"

HW #5 - Due Fri, Dec 11
Ch 5 Review Problems pp. 206-209 #15-50

HW #6
Ch 6

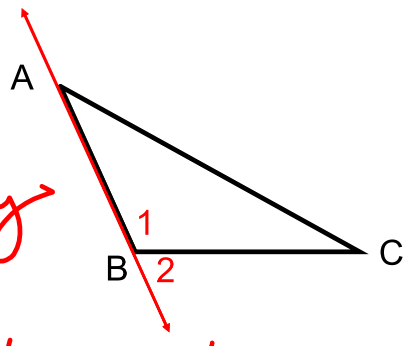
Test #2 - Mon 12/14 or Wed. 12/16?



$\angle 4 > \angle 1$

$\angle 4 > \angle 2$

After proving the Exterior Angle Theorem, Euclid proved that, in any triangle, the sum of any two angles is less than 180°. Prove that, in ΔABC, $\angle A+\angle B<180°$ by giving a reason for each of the following statements.



39. Draw line AB. 2 pts determine a line

40. $\angle 2$ is an exterior angle of ΔABC.

$\angle 2$ forms a linear pair w/ $\angle 1$

41. $\angle 1$ and $\angle 2$ are supplementary.

$\angle$'s in a linear pair are supplementary

42. $\angle 1+\angle 2=180°$.

supplementary $\angle$'s sum to 180°

43. $\angle 2>\angle A$

Exterior $\angle$ Thm (Ext $\angle$ is larger than remote interior $\angle$)

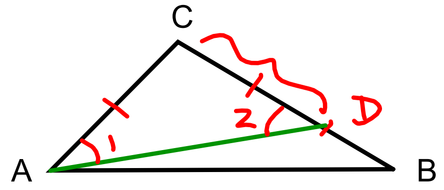
44. $\angle 1+\angle 2>\angle 1+\angle A$

Addition Property of Inequality

45. $180°>\angle 1+\angle A$, so $\angle 1+\angle A<180°$ Substitution (#42 into #43)

5.3 Triangle Side and Angle Inequalities

Theorem 13: If two sides of a triangle are unequal, the angles opposite them are unequal in the same order.



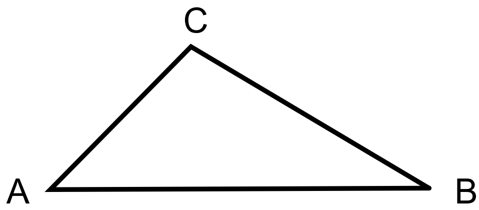
Given: ΔABC with BC>AC

Prove: ∠A>∠B

Proof:

Statements	**Reasons**
1. ΔABC with BC>AC	Given
2. Choose D on CB so that CD=CA	Ruler Postulate & Compass Construction
3. Draw AD	2 Points Determine a line
4. ∠1=∠2	If 2 sides of a Δ are equal then the ∠'s opposite them are =
5. ∠CAB=∠1+∠DAB	Betweenness of Rays
6. ∠CAB>∠1	Whole is Greater than Part
7. ∠CAB>∠2	Substitution
8. ∠2>∠B	Exterior ∠'s are larger than either remote interior ∠
9. ∠CAB>∠B (∠A)	Transitive Property of Inequality

Theorem 14: If two angles of a triangle are unequal, the sides opposite them are unequal in the same order.



Given: ΔABC with ∠A>∠B

Prove: BC>AC

Proof: indirect proof

Statements **Reasons**

Suppose that BC is not longer than AC

4. Then either BC=AC or BC<AC 5. Three Possibilities

6. If BC=AC, then ∠A=∠B 7. If 2 sides of a Δ are equal then the ∠'s opposite them are equal

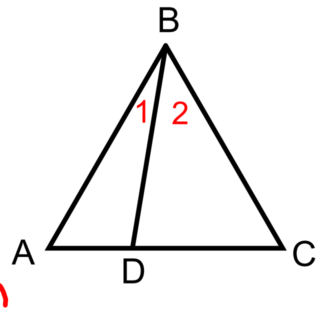
8. This contradicts the hypothesis (given) that ∠A>∠B

9. If BC<AC, then ∠A<∠B 10.

11. This also contradicts the hypothesis that ∠A>∠B

12. Therefore, what we suppose is false and hence BC>AC

Given: ΔABC is equilateral.
Prove: BD>DC



Proof:

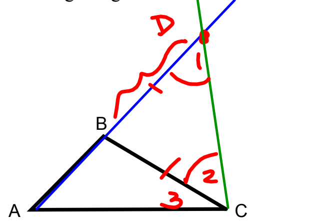
Statements	**Reasons**
45. ∠C=∠ABC	Equilateral Δ is equiangular
46. ∠ABC=∠1+∠2	Betweenness of Rays Theorem
47. ∠ABC>∠2	Whole is Greater than Part
48. ∠C>∠2.	Substitution (#45 into #47)
49. BD>DC	If 2 angles in a Δ are unequal then the sides opposite them are unequal in the same order

5.4 The Triangle Inequality Theorem

Theorem 15: The Triangle Inequality Theorem – The sum of any two sides of a triangle is greater than the third side.

Given: ABC is a triangle

Prove: AB+BC>AC



Proof:

Statements	**Reasons**
1. ABC is a triangle	Given
2. Draw line AB	2 points define a line
3. Choose D beyond B on line AB so that BD=BC	Ruler Postulate & Compass construction
4. Draw CD	2 points define a line
5. ∠1=∠2	If 2 sides of a triangle are equal, the angles opposite them are equal
6. ∠ACD=∠2+∠3	Betweeness of Rays Theorem
7. ∠ACD>∠2	Whole is Greater than Part
8. ∠ACD>∠1	Substitution (#5 into #7)
9. In ΔACD, AD>AC	If 2 ∠'s in a Δ are unequal, the sides opposite them are unequal in the same order
10. AB+BD=AD	Betweenness of Points Theorem
11. AB+BD>AC	Substitution (#10 into 9)
12. AB+BC>AC	Substitution (#3 into 11)

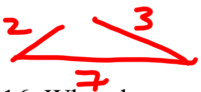
SAT Problem:

If x is an integer and 2<*x*<7, how many different triangles are there with sides of lengths 2, 7, and *x*?

integers between 2&7: 3, 4, 5, 6

15. Could *x*=3? Why or why not?

no — $2+3 \not> 7$



fails the triangle Inequality

16. What do you think is the answer to the problem? Explain.

$\boxed{1}$

(2-$\underline{6}$-7)