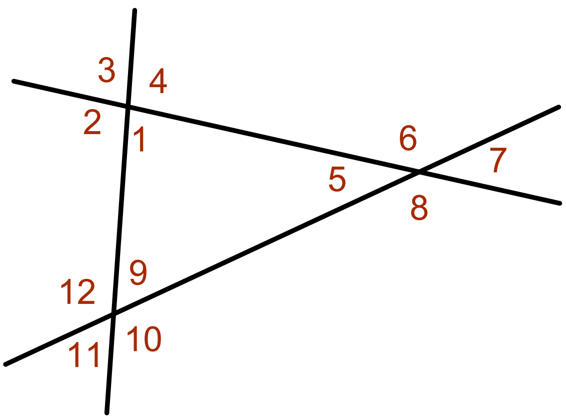
- Ch 4 Review Problems pp.176-180 #7-36, 48,51,52 due MONDAY 12/12
- Quiz Wednesday 12/14

---

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




31. What does the result in exercise 30 indicate about the sum of the exterior angles of a triangle?

$= 720^\circ$

**Find each of the following sums.**

26. 1+ 2+ 3+ 4

$360^\circ$

27. 1+ 2+ 3+ 4+ 5+ 6+ 7+ 8+ 9+ 10+ 11+ 12

$3(360^\circ) = 1080^\circ$

28. 1+ 5+ 9

$180^\circ$

29. 3+ 7+ 11

$180^\circ$

30. 2+ 4+ 6+ 8+ 10+ 12

$1080^\circ - 180^\circ - 180^\circ = 720^\circ$

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, A+ B<180° by giving a reason for each of the following statements.

39. Draw line AB. 2 points define a line

40. 2 is an exterior angle of ΔABC.
it forms a linear pair w/ ∠1

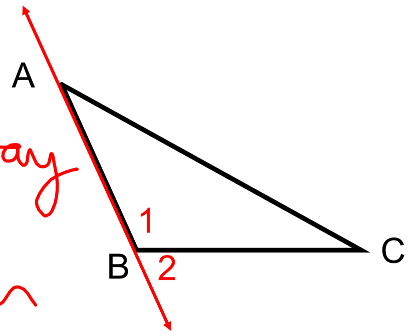
41. 1 and 2 are supplementary.
angles in a linear pair are supplementary

42. 1+ 2=180°.
supplementary ∠'s sum to 180°

43. 2> A an exterior angle is greater than either remote interior angle

44. 1+ 2> 1+ A
addition property of inequality

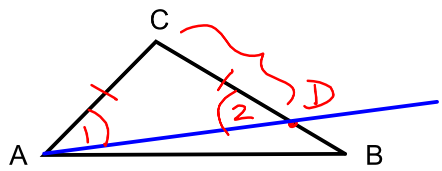
45. 180°> 1+ A, so 1+ A<180° Substitution (#42 into 44)




**5.3 Triangle Side and Angle Inequalities**

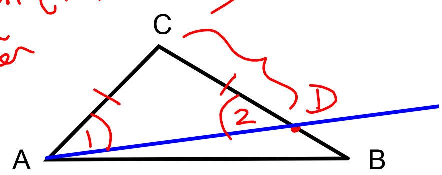
Theorem 13: If two sides of a triangle are unequal, the angles opposite them are unequal in the same order.

*Given:* ΔABC with BC>AC
*Prove:* A> B



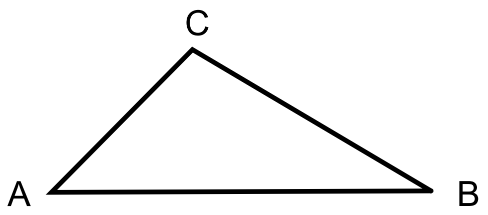

*Proof:*

| **Statements** | **Reasons** |
|---|---|
| 1. ΔABC with BC>AC | Given |
| 2. Choose D on CB so that CD=CA | Ruler Postulate |
| 3. Draw AD | 2 points define a line |
| 4. 1= 2 | If 2 sides of a triangle are equal, the angles opposite them are = |
| 5. CAB= 1+ DAB | Betweenness of Rays Theorem |
| 6. CAB> 1 | Whole is greater than part |
| 7. CAB> 2 | Substitution (#4 into #6) |
| 8. 2> B ∠ext. to ΔADB | exterior ∠'s are greater than either remote interior ∠ |
| 9. CAB> B | Transitive Property of Inequality |



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

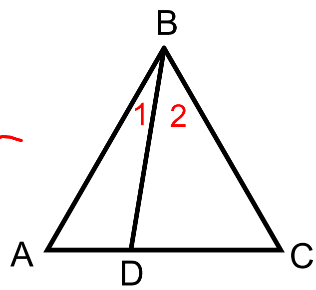
*Given:* ΔABC with A> B
*Prove:* BC>AC




*Proof:*

| **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 the angles opposite them are = |
| 8. This contradicts the hypothesis (given) that ∠A>∠B | |
| 9. If BC<AC, then ∠A<∠B | 10. Thm 13 |
| 11. This also contradicts the hypothesis that ∠A>∠B | |
| 12. Therefore, what we suppose is false and BC>AC. | |

*Given:* ΔABC is equilateral.
*Prove:* BD>DC




*Proof:*

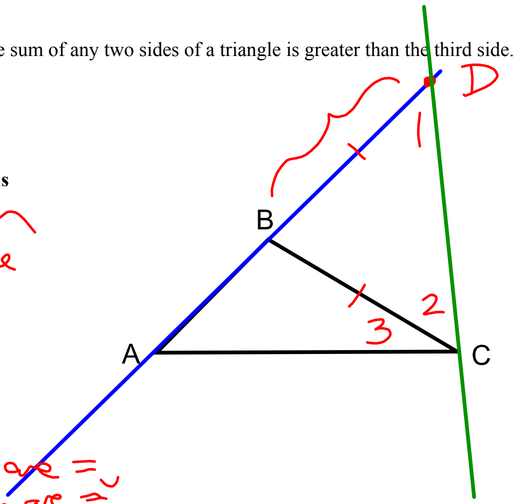
| **Statements** | **Reasons** |
|---|---|
| 45. C= ABC | Equilateral Δ's are equiangular |
| 46. ABC= 1+ 2 | Betweenness of Rays Theorem |
| 47. ABC> 2 | Whole greater than part |
| 48. C> 2. | Substitution #45 into #47 |
| 49. BD>DC | If 2∠'s in a Δ are unequal, then the sides opposite them are unequal 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 |
| 4. Draw CD | 2 points define a line |
| 5. 1= 2 | If 2 sides of a Δ are = the ∠'s opposite them are = |
| 6. ACD= 2+ 3 | Betweeness of Rays Theorem |
| 7. ACD> 2 | Whole greater than Part |
| 8. ACD> 1 | Substitution |
| 9. In ΔACD, AD>AC | If 2 ∠'s in a Δ are unequal, then 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 |