Khan Academy exercises: "Congruence" and other recommended topics

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

HW #6 - Due Wed. Dec 16
Ch 6 Review Problems pp. 250-254 #9-19, 33-53

Test #2 - Wed. Dec 16

Theorem 17: Equal corresponding angles mean that lines are parallel.
Corollary 1: Equal alternate interior angles mean that lines are parallel.
Corollary 2: Supplementary interior angles on the same side of a transversal mean that lines are parallel.
Corollary 3: In a plane, two lines perpendicular to a third line are parallel.

The Parallel Postulate – Through a point not on a line, there is exactly one line parallel to the given line.

Theorem 18: In a plane, two lines parallel to a third line are parallel to each other.

Theorem 19: Parallel lines form equal corresponding angles.

Corollary 1: Parallel lines form equal alternate interior angles.

Corollary 2: Parallel lines form supplementary interior angles on the same side of a transversal.

Corollary 3: In a plane, a line perpendicular to one of two parallel lines is also perpendicular to the other.

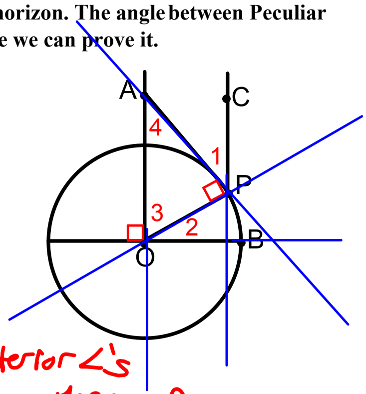
Theorem 20: The Angle Sum Theorem – The sum of the angles of a triangle is 180°.
Corollary 1: If two angles of one triangle are equal to two angles of another triangle, the third angles are equal.
Corollary 2: The acute angles of a right triangle are complementary.
Corollary 3: Each angle of an equilateral triangle is 60°.

Theorem 21: An exterior angle of a triangle is equal to the sum of the remote interior angles.

In Peculiar, Missouri, the North Star is always 38° above the horizon. The angle between Peculiar and the equator also is 38°, which isn't really peculiar, because we can prove it.

Given: Line OB represents the equator of planet Earth.
Point P represents Peculiar, Missouri.
Point C represents the North Star.
The angle of elevation of the North Star at P is ∠1.
The latitude of P is ∠2.
OA||PC, OA⊥OB, and OP⊥PA.

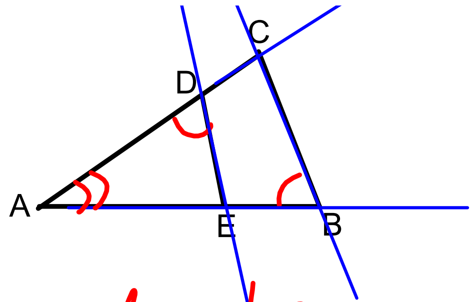
Prove: ∠1=∠2.



1. Given
2. ∠1=∠4 — parallel lines form equal alternate interior ∠'s
3. ∠3+∠4+90°=180° — △ sum theorem
4. ∠3+∠4=90° — subtraction
5. ∠2+∠3=∠BOA — Betweenness of Rays Thm.
6. ∠BOA is a right ∠ — Perpendicular lines form right ∠'s
7. ∠BOA=90° — Right ∠'s measure 90°
8. ∠2+∠3=90° — Substitution
9. ∠2+∠3=∠3+∠4 — substitution
10. ∠2=∠4 — subtraction
11. ∠2=∠1 — Substitution

45. *Given:* In ΔABC and ΔADE, ∠ADE=∠B.

Prove: ∠AED=∠C.



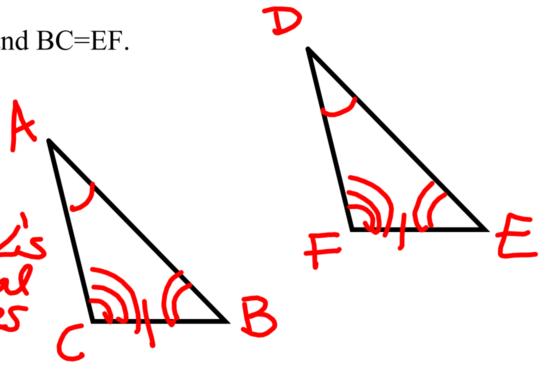
1. Given
2. ∠DAE=∠CAB — Reflexive
3. ∠AED=∠C — △'s w/ 2 equal angles have equal 3rd angles

6.6 - AAS and HL Congruence

Theorem 22: The AAS Theorem – If two angles and the side opposite one of them in one triangle are equal to the corresponding parts of another triangle, the triangles are congruent.

Given: ΔABC and ΔDEF with ∠A=∠D, ∠B=∠E, and BC=EF.

Prove: ΔABC≅ΔDEF

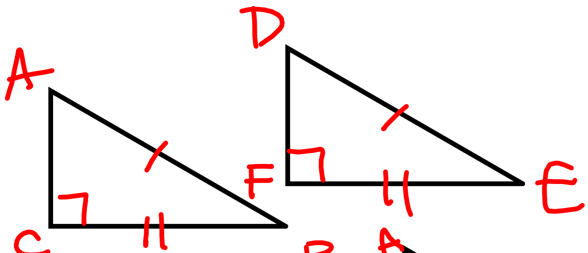


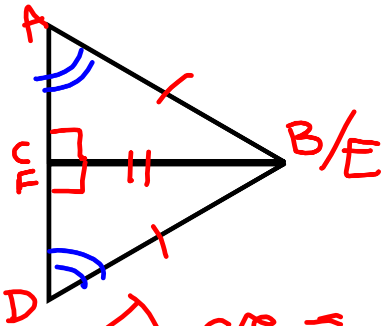
1. Given
2. ∠C=∠F   Δ's w/ 2 equal ∠'s have equal 3rd angles
3. ΔABC≅ΔDEF   ASA congruence

Theorem 23: The HL Theorem – If the hypotenuse and a leg of one right triangle are equal to the corresponding parts of another right triangle, the triangles are congruent.

Given: ΔABC and ΔDEF are right triangles with right angles C and F; AB=DE and BC=EF.

Prove: ΔABC≅ΔDEF





1. Given
2. ∠C=90°, ∠F=90°
3. ∠C+∠F=180°
4. ∠C & ∠F are supp.
5. ∠C & ∠F form a linear pair
6. A, C, & C are collinear
7. ∠A=∠D   If 2 sides of a Δ are =, the ∠'s opposite them are =
8. ΔABC≅ΔDEF   AAS congruence