1. $AB + BC = AC$
2. two equal angles
3. $\angle AOB + \angle BOC = \angle AOC$
4. postulate
5. congruent
6. $180°$
7. perpendicular
8. equal
9. unequal in the same order
10. $a = b$, $a < b$, $a > b$
11. $a > c$
12. $a + c > b + d$
13. $a < c$ & $b < c$
($c > a$ & $c > b$)
14. greater than the third side
15. $\angle 1$ & $\angle 3$
16. $\angle 2$ & $\angle 4$
17. $\angle 2$ & $\angle 3$
18. $\angle 3 > \angle 5$

19. $a \parallel b$
20. $\angle 1 = \angle 3$
21. $\angle 3$ and $\angle 4$ are supplementary
22. $\angle 3 + \angle 4 = 180°$
23. $\angle 1 + \angle 4 = 180°$

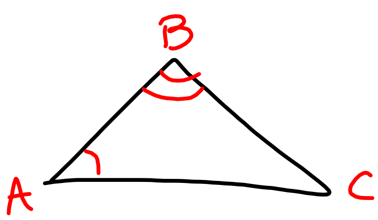
Theorem 17: Equal corresponding angles mean that lines are parallel.
Corollary 1: Equal alternate interior angles mean that lines are parallel.
Corollary 2: Supplementary interior angles on the same side of a transversal mean that lines are parallel.
Corollary 3: In a plane, two lines perpendicular to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

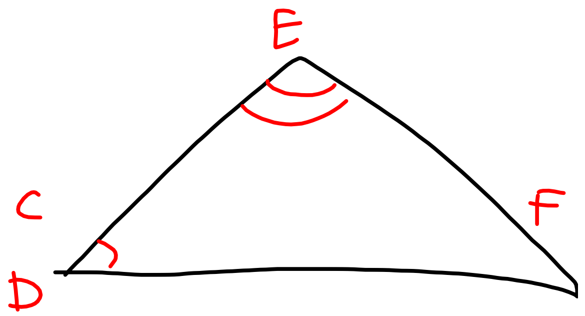
The Parallel Postulate – Through a point not on a line, there is exactly one line parallel to the given line.
Theorem 18: In a plane, two lines parallel to a third line are parallel to each other.

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.





Given: $\angle A = \angle D$
$\angle B = \angle E$

Prove: $\angle C = \angle F$

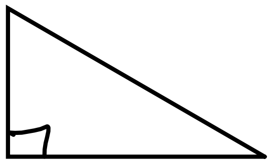
Proof

Statements	Reasons
1. $\angle A = \angle D$ & $\angle B = \angle E$	Given
2. $\angle A + \angle B + \angle C = 180°$ & $\angle D + \angle E + \angle F = 180°$	Triangle Sum Theorem
3. $\angle A + \angle B + \angle C = \angle D + \angle E + \angle F$	Substitution (#2)
4. $\angle A + \angle B + \angle C = \angle A + \angle B + \angle F$	Substitution (#1 & 3)
5. $\angle C = \angle F$	Subtraction

Corollary 2: The acute angles of a right triangle are complementary.

Given:
$\angle C$ is a right angle

Prove:
$\angle A$ and $\angle B$ are complimentary

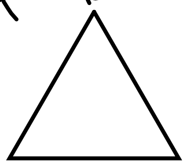


Proof:

Statements	Reasons
1. $\angle C$ is a right angle	Given
2. $\angle C = 90°$	Right angles measure 90°
3. $\angle A + \angle B + \angle C = 180°$	Triangle Sum Theorem
4. $\angle A + \angle B + 90° = 180°$	Substitution (#2 & #3)
5. $\angle A + \angle B = 90°$	Subtraction
6. $\angle A$ and $\angle B$ are complementary	Complementary angles sum to 90°.

Corollary 3: Each angle of an equilateral triangle is 60°.

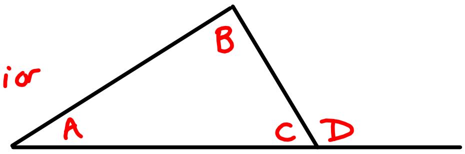
Given: $\triangle ABC$ is equilateral
Prove: $\angle A = 60°$
$\angle B = 60°$
$\angle C = 60°$



Proof:

Statements	Reasons
1. $\triangle ABC$ is equilateral	Given
2. $\triangle ABC$ is equiangular	Equilateral $\triangle$'s are equiangular
3. $\angle A = \angle B = \angle C$	all $\angle$'s in an equiangular $\triangle$ are equal
4. $\angle A + \angle B + \angle C = 180°$	Triangle Sum Theorem
5. $\angle A + \angle A + \angle A = 180°$ $3\angle A = 180°$	substitution (#3 & 4) & simplification
6. $\angle A = 60°$	division
7. $\angle B = 60°$, $\angle C = 60°$	substitution (#3 & #6)

Theorem 20: An exterior angle of a triangle is equal to the sum of the remote interior angles.



Given: $\angle D$ is an exterior angle w/ remote interior $\angle$'s $\angle A$ & $\angle B$

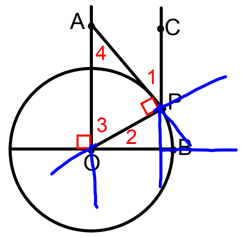
Prove: $\angle D = \angle A + \angle B$

Proof:

Statements	Reasons
1. $\angle D$ is an exterior $\angle$ w/ remote interior $\angle$'s $\angle A$ and $\angle B$	Given
2. $\angle D$ and $\angle C$ form a linear pair	def. of exterior angles
3. $\angle D + \angle C = 180°$	$\angle$'s in a linear pair are supplementary & hence sum to 180°.
4. $\angle A + \angle B + \angle C = 180°$	Triangle Sum Theorem
5. $\angle D + \angle C = \angle A + \angle B + \angle C$	Substitution (#3 & 4)
6. $\angle D = \angle A + \angle B$	Subtraction

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.

angle of elevation



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 $\angle 1$.
The latitude of P is $\angle 2$.
OA||PC, OA OB, and OP PA.

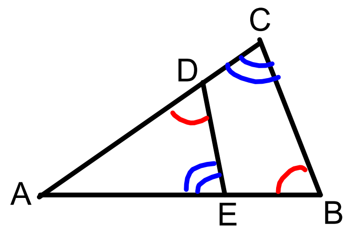
Prove: $\angle 1 = \angle 2$.

Proof:

Statements	Reasons
1. OA || PC, $OA \perp OB$, $OP \perp PA$	Given
2. $\angle 2 + \angle 3 = \angle BOA$	Betweenness of Rays Theorem
3. $\angle BOA$ is a right $\angle$ (& hence $\angle BOA = 90°$)	Perpendiculars OA & OB form right $\angle$'s, which all = 90°.
4. $\angle 2 + \angle 3 = 90°$	Substitution (#2 & #3)
5. $\angle 1 = \angle 4$	parallels OA & PC form equal alternate interior angles
6. $\angle 4$ and $\angle 3$ are complementary	In a right Δ, the 2 acute $\angle$'s are complementary
7. $\angle 4 + \angle 3 = 90°$	Complementary $\angle$'s sum to 90°.
8. $\angle 2 + \angle 3 = \angle 4 + \angle 3$	Substitution (# 4 & 7)
9. $\angle 2 = \angle 4$	Subtraction
10. $\angle 2 = \angle 1$	substitution (# 5 & 9)

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

Prove: ∠AED=∠C.



Proof:

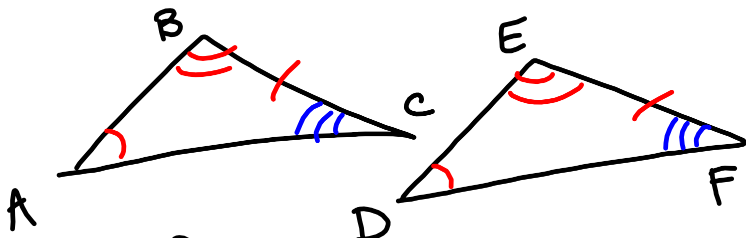
Statements	Reasons
1. ∠ADE = ∠B	Given
2. ∠A = ∠A (∠DAE = ∠BAC)	Reflexive
3. ∠AED = ∠C	If 2 angles in 2 triangles are equal, the corresponding 3rd angles are equal.

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



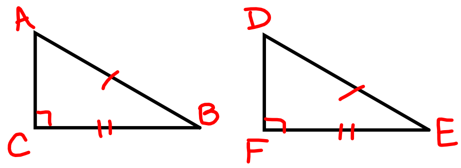
Proof:

Statements	Reasons
1. ∠A = ∠D, ∠B = ∠E, BC = EF	Given
2. ∠C = ∠F	2 equal angles ⇒ 3rd ∠ is equal
3. ΔABC ≅ DEF	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.

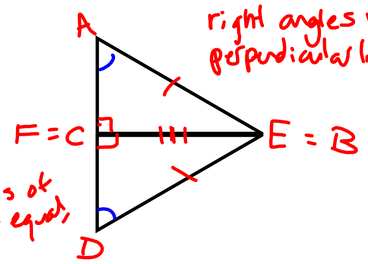
Given: ΔABC and ΔDEF are right triangles with right angles C and F; AB=DE and BC=EF.

Prove: ΔABC≅ΔDEF



Proof

Statements	Reasons
1. ∠C and ∠F are right ∠'s AB=DE, BC=EF	Given
2. ∠C=∠F	all right ∠'s are equal
3. AD is a perpendicular line to CB	right angles mean perpendicular lines
4. ΔADB is a triangle	
5. ∠A=∠D	If 2 sides of a Δ are equal, the angles opposite them are equal
6. ΔABC ≅ ΔDEF	AAS congruence

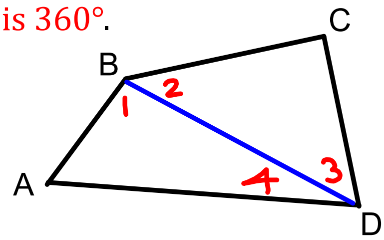


7.1 – Quadrilaterals

Def: A diagonal of a polygon is a line segment that connects any two nonconsecutive vertices.

Theorem 24: The sum of the angles of a quadrilateral is 360°.

Given: ABCD is a quadrilateral.
Prove: ∠A+∠B+∠C+∠D=360°



Proof:

Statements	**Reasons**
1. Draw BD	2 points define a line
2. ∠A+∠1+∠4=180° and ∠2+∠3+∠C=180°	Triangle Sum Theorem
3. ∠A+∠1+∠4+∠2+∠3+∠C=~~180°~~ 360°	Addition
4. ∠1+∠2=∠ABC and ∠3+∠4=∠CDA	Betweenness of Rays Theorem
5. ∠A+∠ABC+∠C+∠CDA=360° (∠B, ∠D)	Substitution (# 3 & 4)

HW #1 (submitted Friday, 11/7)
- Ch 1 Review Problems pp. 36-38
- Start working on Geometry badge on Khan Academy

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 intersecting lines"

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

HW #4 (submitted Friday, 12/5)
- Ch 5 Review Problems pp. 206-209
- Work toward mastery of practiced Khan Academy exercises in "Introduction to Euclidean Geometry," "Angles and Intersecting Lines," and "Congruence"

HW #5 (due Friday, 12/12)
- **Ch 6 Review Problems pp. 250-254**
- Start working on Ch 7 Review Problems pp. 292-295