

- Ch 5 Review Problems pp. 206-209 #15-50 due FRIDAY 01/06
- TEST #2 - Wednesday 01/11

- Ch 6 Review Problems pp. 250-254 #9-19, 33-53

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.

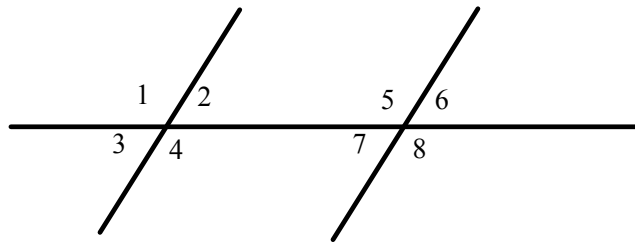
Corollary 3: In a plane, two lines perpendicular to a third line are parallel.

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.

6.4 – Parallel Lines and Angles

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.**

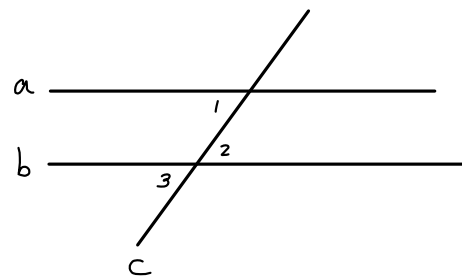
Proof of Cor 1

Given : $a \parallel b$

Prove : $\angle 1 = \angle 2$

Proof

1. $a \parallel b$
2. $\angle 1 = \angle 3$
3. $\angle 2 = \angle 3$
4. $\angle 1 = \angle 2$

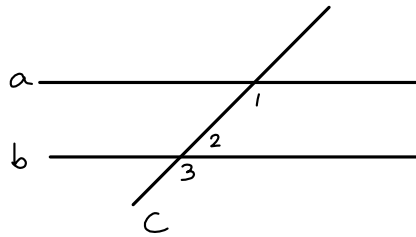


Given
 Parallel lines form equal corresponding \angle 's
 Vertical \angle 's are equal
 substitution

Proof of Cor 2

Given: $a \parallel b$

Prove: $\angle 1$ & $\angle 2$ are supplementary



Proof

1. $a \parallel b$

2. $\angle 1 = \angle 3$

3. $\angle 2$ and $\angle 3$ are supplementary

4. $\angle 2 + \angle 3 = 180^\circ$

5. $\angle 2 + \angle 1 = 180^\circ$

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

Given

Parallel lines form = corresponding \angle 's

\angle 's in a linear pair are supplementary

supplementary \angle 's sum to 180°

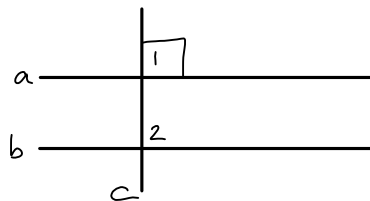
substitution

\angle 's that sum to 180° are supplementary

Proof of Cor 3

Given: $c \perp a$ & $a \parallel b$

Prove: $c \perp b$



Proof

1. $c \perp a$ and $a \parallel b$

2. $\angle 1 = \angle 2$

3. $\angle 1$ is a right \angle

4. $\angle 1 = 90^\circ$

5. $\angle 2 = 90^\circ$

6. $\angle 2$ is a right angle

7. $c \perp b$

Given

Parallel lines form equal corresponding \angle 's

Perpendicular lines form right \angle 's
right \angle 's measure 90°

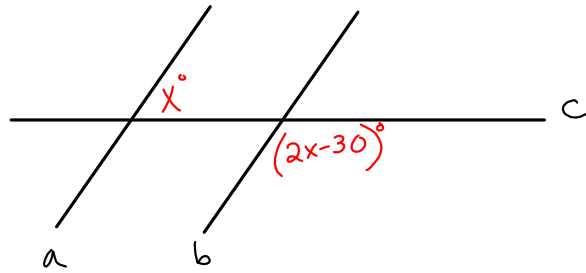
substitution

right \angle 's measure 90°

Perpendicular lines meet @ right \angle 's

SAT Problem

Given: $a \parallel b$



45. Write an equation relating the measures of the two indicated angles.

$$x + 2x - 30 = 180$$

$$3x = 210$$

46. Find the measure of the acute angle.

$$x = 70^\circ$$

47. Find the measure of the obtuse angle.

$$2(70) - 30 = 140 - 30 = \boxed{110^\circ}$$

6.5 - The Angles of a Triangle

Theorem 20: **The Angle Sum Theorem** – The sum of the angles of a triangle is 180° .

Given: $\triangle ABC$

Prove: $A + B + C = 180^\circ$

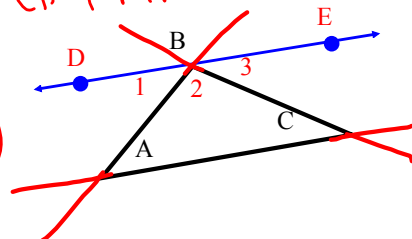
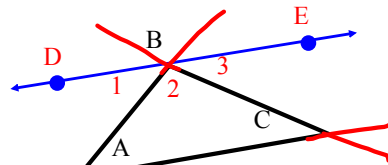
Proof:

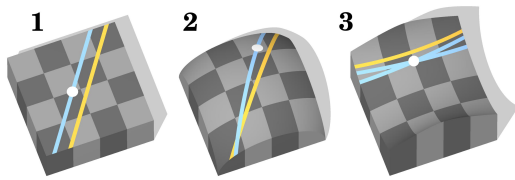
Statements

1. $\triangle ABC$
2. Through point B, draw line $DE \parallel AC$
3. $\angle 1 = \angle A$ and $\angle 3 = \angle C$
4. $\angle 1 + \angle 2 = \angle DBC$
5. $\angle DBC$ and $\angle 3$ are supplementary
6. $\angle DBC + \angle 3 = 180^\circ$
7. $\angle 1 + \angle 2 + \angle 3 = 180^\circ$
8. $\angle A + \angle B + \angle C = 180^\circ$

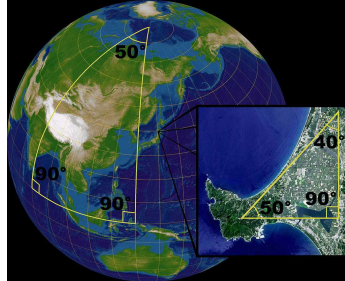
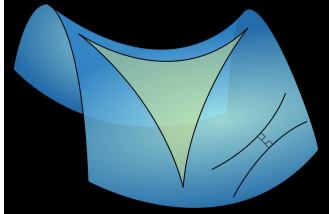
Reasons

Given
 Parallel Postulate
 Parallel lines form equal alternate interior \angle 's
 Betweenness of Rays Theorem
 \angle 's in a linear pair are supplementary
 Supplementary \angle 's sum to 180°
 Substitution (#4 into #6)
 Substitution (#3 into #7)





In non-Euclidean geometries, the angles in a triangle do not necessarily sum to 180!



Crocheted hyperbolic planes violating the Parallel Postulate
<http://theiff.org/oexhibits/oe1e.html>

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