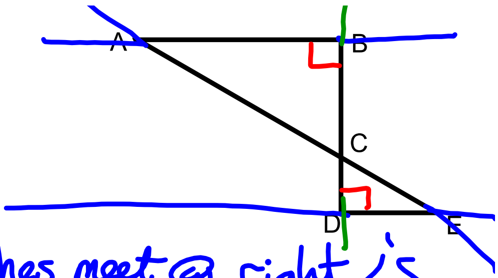
Khan Academy exercises: "Congruence" and other recommended topics

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

HW #6
Ch 6 Review Problems pp. 250-254

Test #2 - Wed. 12/16



Given: ∠ABD and ∠BDE are right angles

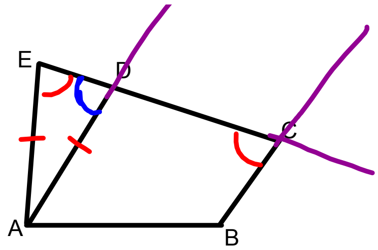
Prove:AB||DE

29. Proof:

Statements	**Reasons**
1. ∠ABD and ∠BDE are right angles	Given
2. AB⊥BD and BD⊥DE	Perpendicular lines meet @ right ∠'s
3. AB||DE	2 lines perpendicular to the same line are parallel

30. Proof:

Statements	**Reasons**
1. ∠ABD and ∠BDE are right angles	Given
2. ∠ABD=∠BDE	All right ∠'s are equal
3. AB||DE	equal alternate interior ∠'s mean lines are parallel



39.

Given: AE=AD and ∠E=∠BCE

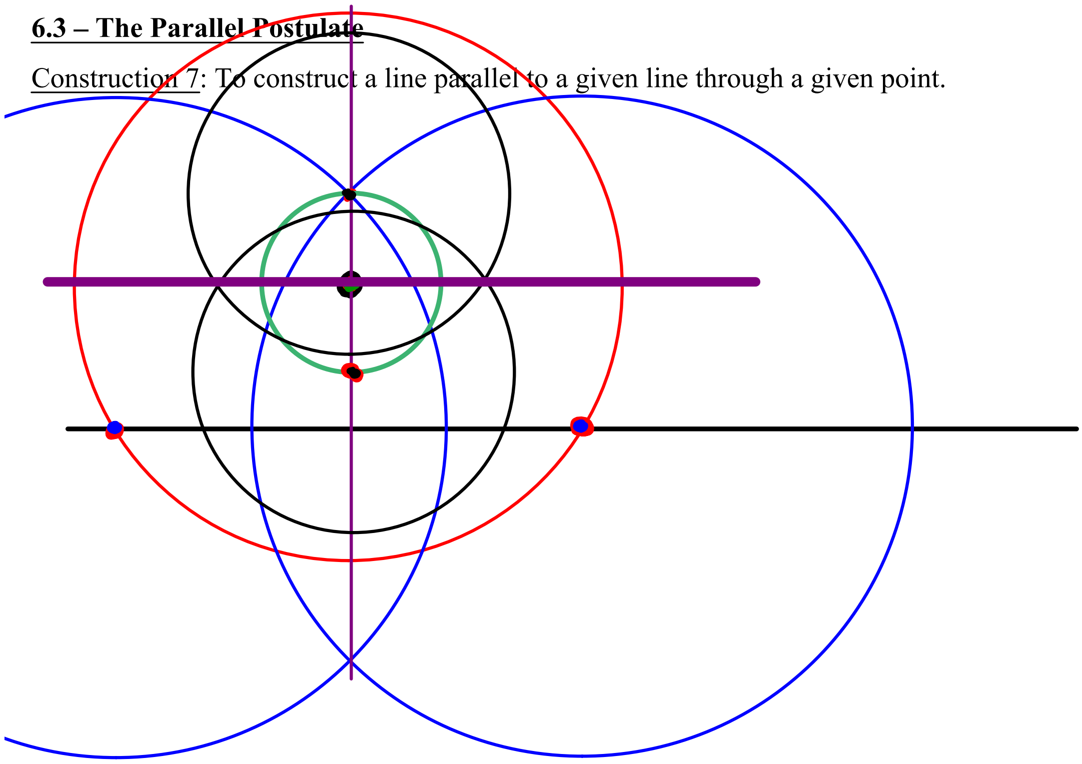
Prove: AD||BC

Proof :

1. AE=AD & ∠E=∠BCE — Given
2. ∠ADE=∠E — If 2 sides of a Δ are equal, the angles opposite them are equal
3. ∠ADE=∠BCE — Substitution (#1 & #2)
4. AD || BC — equal corresponding ∠'s mean lines are parallel

6.3 – The Parallel Postulate

Construction 7: To construct a line parallel to a given line through a given point.



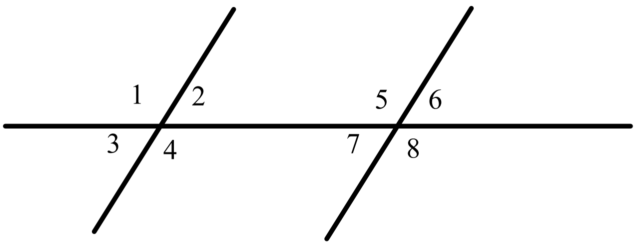
Theorem 17: Equal corresponding angles mean that lines are parallel.
Corollary 1: Equal alternate interior angles mean that lines are parallel.
Corollary 2: Supplementary interior angles on the same side of a transversal mean that lines are parallel.
Corollary 3: In a plane, two lines perpendicular to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



corresponding ∠'s:
∠1 & ∠5
∠2 & ∠6
∠3 & ∠7
∠4 & ∠8

Corollary 1: Parallel lines form equal alternate interior angles. ∠2 & 7 , ∠4 & 5

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

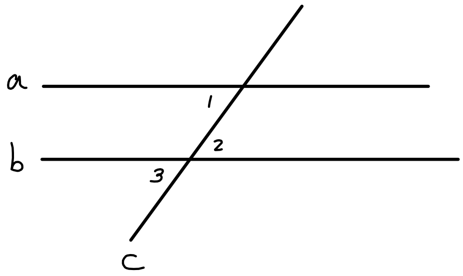
∠2 & 5 , ∠4 & 7

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. $a \parallel b$ Given
2. $\angle 1 = \angle 3$ parallel lines yield equal corresponding angles

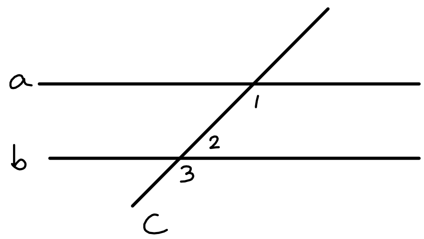
$\angle 1$ & $\angle 2$ are alternate interior $\angle$'s

3. $\angle 2 = \angle 3$ vertical $\angle$'s are equal
4. $\angle 1 = \angle 2$ Substitution (# 2 into 3)

Proof of Cor 2

Given: $a \parallel b$

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

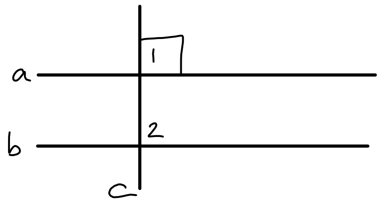


1. $a \parallel b$ Given
2. $\angle 1 = \angle 3$ Parallel Lines yield equal corresponding angles
3. $\angle 2$ & $\angle 3$ are supplementary angles in a linear pair are supplementary
4. $\angle 2 + \angle 3 = 180°$ supplementary $\angle$'s sum to 180°
5. $\angle 2 + \angle 1 = 180°$ Substitution (#2 into #4)
6. $\angle 2$ & $\angle 1$ are supplementary (supp. $\angle$'s sum to 180°)

Proof of Cor 3

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

Prove: $c \perp b$



1. $c \perp a$; $a \parallel b$	Given
2. $\angle 1 = \angle 2$	Parallel lines yield equal corresponding $\angle$'s
3. $\angle 1$ is a right $\angle$	perpendicular lines meet @ right $\angle$'s
4. $\angle 1 = 90°$	right $\angle$'s measure 90°
5. $\angle 2 = 90°$	Substitution
6. $\angle 2$ is a right $\angle$	right $\angle$'s measure 90°
7. $b \perp c$	perpendicular lines meet @ right $\angle$'s

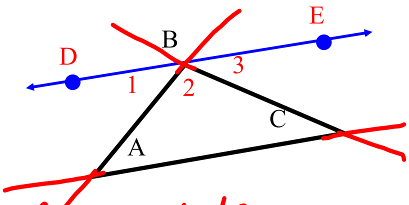
6.5 – The Angles of a Triangle

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

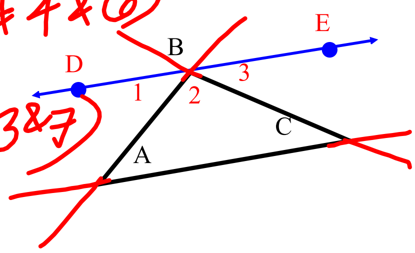
Given: ΔABC

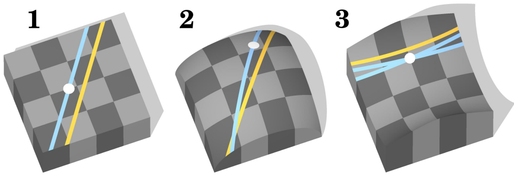
Prove: $\angle A + \angle B + \angle C = 180°$

Proof:

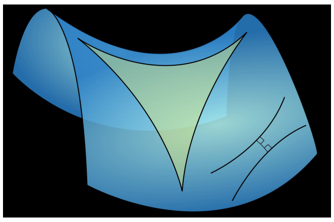


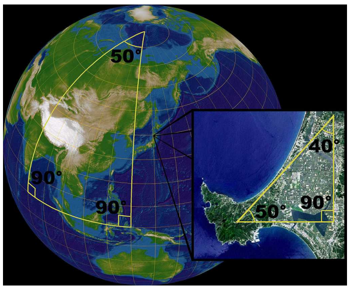
Statements	**Reasons**
1. ΔABC	Given
2. Through point B, draw line DE||AC	Compass constr. Parallel Postulate
3. $\angle 1 = \angle A$ and $\angle 3 = \angle C$	Parallel lines yield equal alt. int. $\angle$'s
4. $\angle 1 + \angle 2 = \angle DBC$	Betweeness of Rays Thm.
5. $\angle DBC$ and $\angle 3$ are supplementary	$\angle$'s in a linear pair are supplementary
6. $\angle DBC + \angle 3 = 180°$	Supp $\angle$'s sum to 180°
7. $\angle 1 + \angle 2 + \angle 3 = 180°$	Substitution (#4 & 6)
8. $\angle A + \angle B + \angle C = 180°$	Substitution (#3 & 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