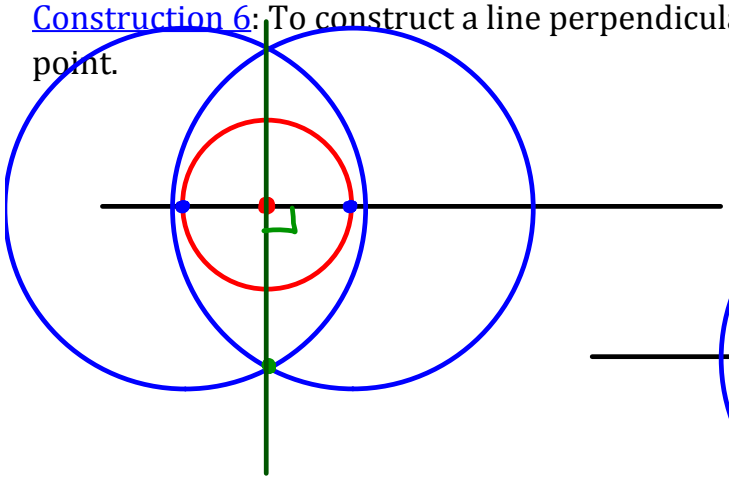
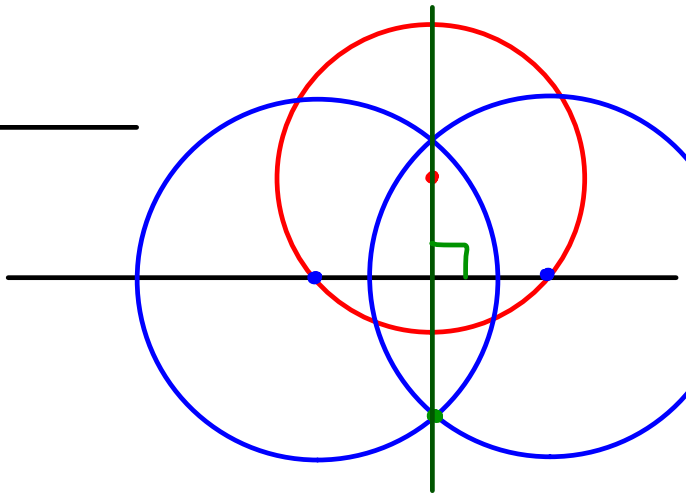
6.1 – Line Symmetry

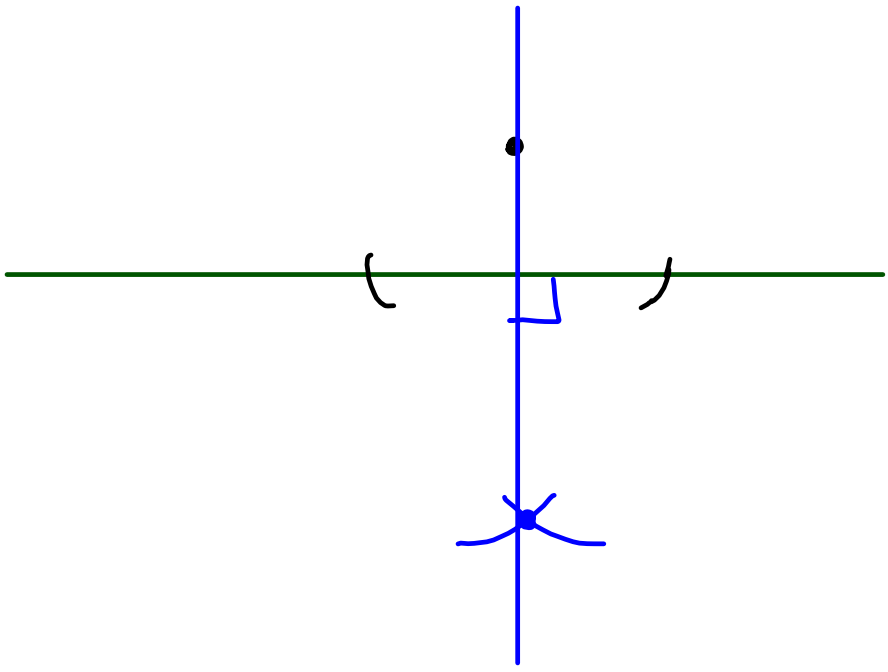
Def: Two points are symmetric with respect to a line iff the line is the perpendicular bisector of the line segment connecting the two points.

Theorem 16: In a plane, two points each equidistant from the endpoints of a line segment determine the perpendicular bisector of the line segment.

Construction 6: To construct a line perpendicular to a given line through a given point.

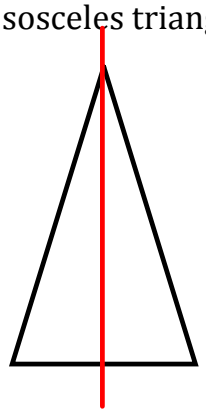




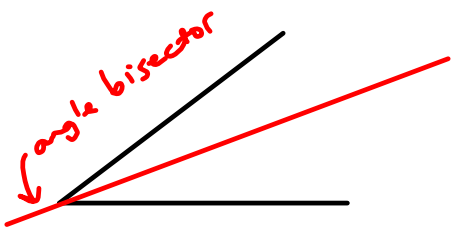


Sketch the lines of symmetry.

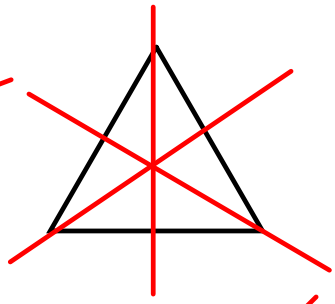
5. Isosceles triangle



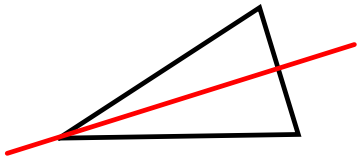
6. Angle



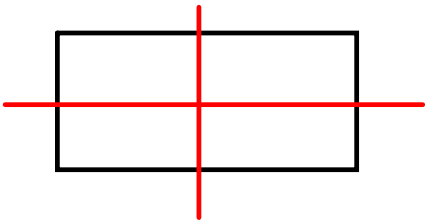
7. Equilateral triangle



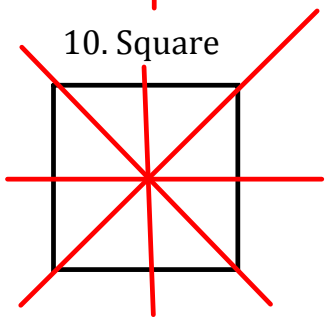
8. Isosceles triangle



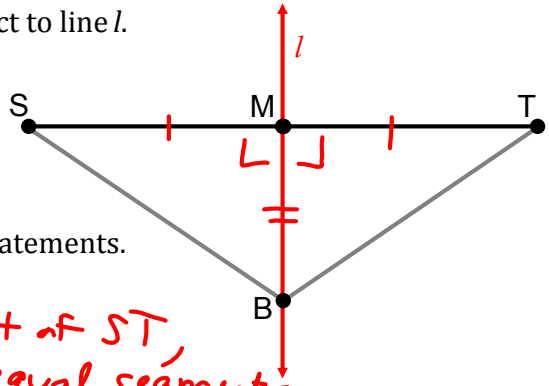
9. Rectangle



10. Square



Points S and T are symmetric with respect to line *l*.



21. What can you conclude about line *l*?

$l \perp ST$

l bisects ST

$\Rightarrow$ M is the midpoint of ST

Give a reason for each of the following statements.

22. SM=MT

l bisects ST, M is midpoint of ST, & hence divides it into two equal segments

23. ∠BMS and ∠BMT are right angles

perpendiculars meet @ right angles

24. ∠BMS=∠BMT

all right angles are equal

25. MB=MB

reflexive property

26. ΔBMS≅ΔBMT

SAS congruence

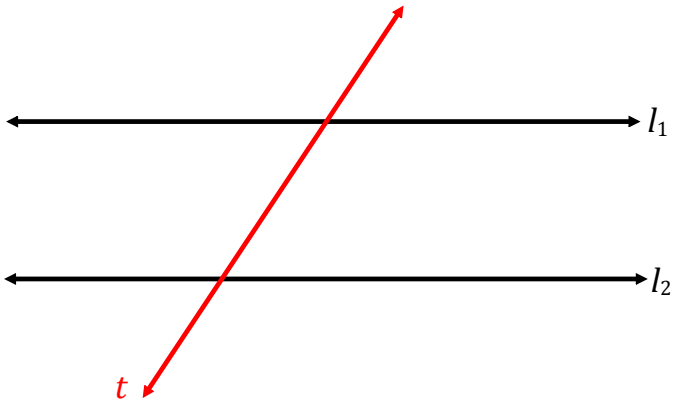
27. BS=BT

corresponding parts of congruent △'s are equal

6.2 – Proving Lines Parallel

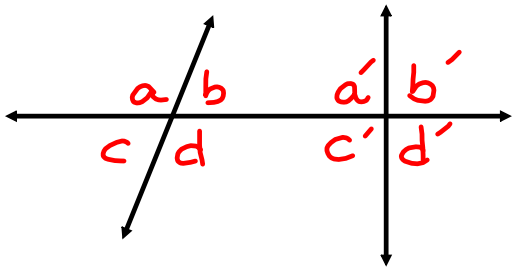
Def: Two lines are parallel iff they lie in the same plane and do not intersect.

A transversal is a line that intersects two or more lines in different points.

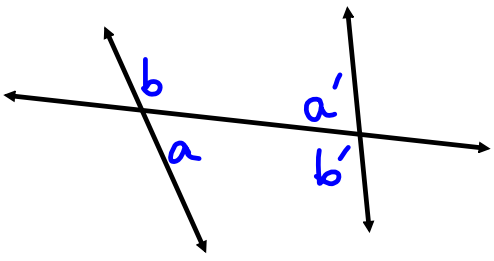


When a transversal intersects two lines that lie in the same plane, it forms pairs of angles that are given special names:

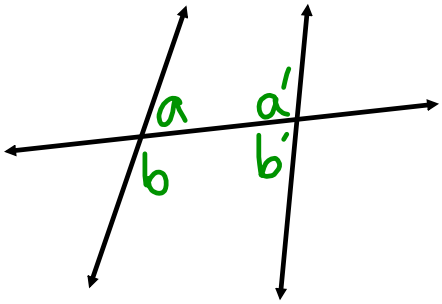
Corresponding angles



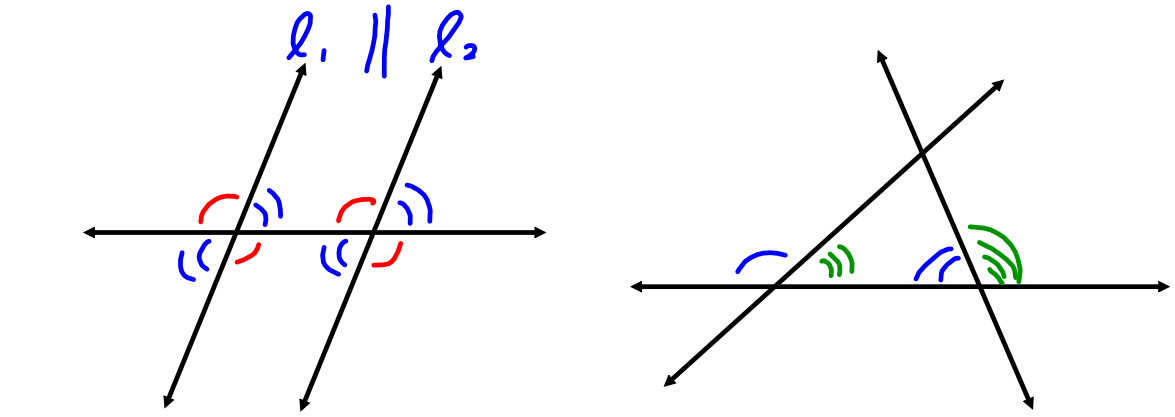
Alternate interior angles



Interior angles on the same side of the transversal



Theorem 17: Equal corresponding angles mean that lines are parallel.



⊥ perpendicular ∥ parallel

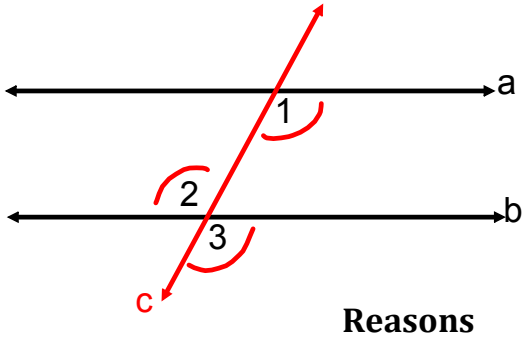
Corollary 1: Equal alternate interior angles mean that lines are parallel.

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.

Corollary 1: Equal alternate interior angles mean that lines are parallel.

Given: ∠1=∠2
Prove: a||b



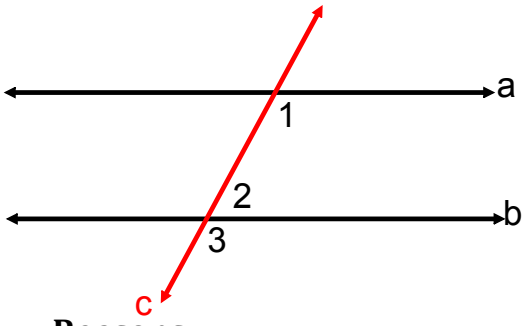
Proof:

Statements	**Reasons**
1. $\angle 1 = \angle 2$	Given
2. $\angle 2 = \angle 3$	Vertical angles are equal
3. $\angle 1 = \angle 3$	Substitution
4. $a \parallel b$	Equal corresponding angles mean that lines are parallel.

<u>Corollary 2</u>: Supplementary interior angles on the same side of a transversal mean that lines are parallel.

Given: ∠1 and ∠2 are supplementary

Prove: a||b



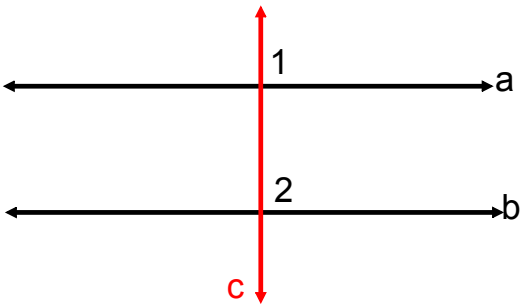
Proof:

Statements	Reasons
1. ∠1 and ∠2 are supplementary	Given
2. ∠2 and ∠3 are supplementary	The angles in a linear pair are supplementary
3. ∠1 = ∠3	Supplements of the same angle are equal
4. a || b	Equal corresponding angles mean that lines are parallel.

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

Given: a c and b c

Prove: a||b

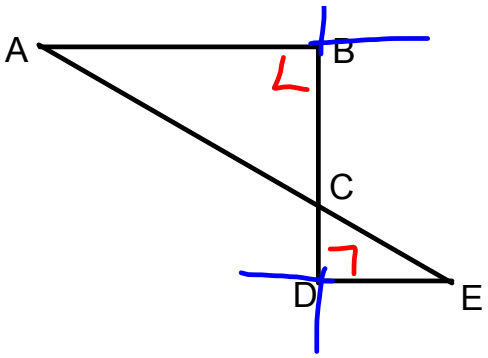


Proof:

Statements	Reasons
1. a ⊥ c and b ⊥ c	Given
2. ∠1 & ∠2 are right angles	Perpendicular lines form right angles
3. ∠1 = ∠2	All right angles are equal
4. a || b	Equal corresponding angles mean that lines are parallel.

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	perpendiculars meet @ right angles
3. AB||DE	two lines perpendicular to a third line are parallel

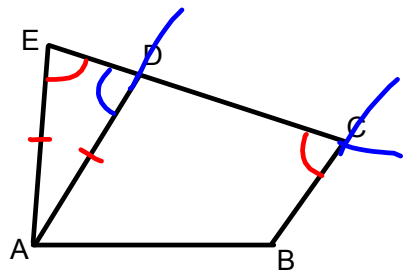
30. Proof:

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

39.

Given: AE=AD and ∠E=∠BCE

Prove: AD||BC

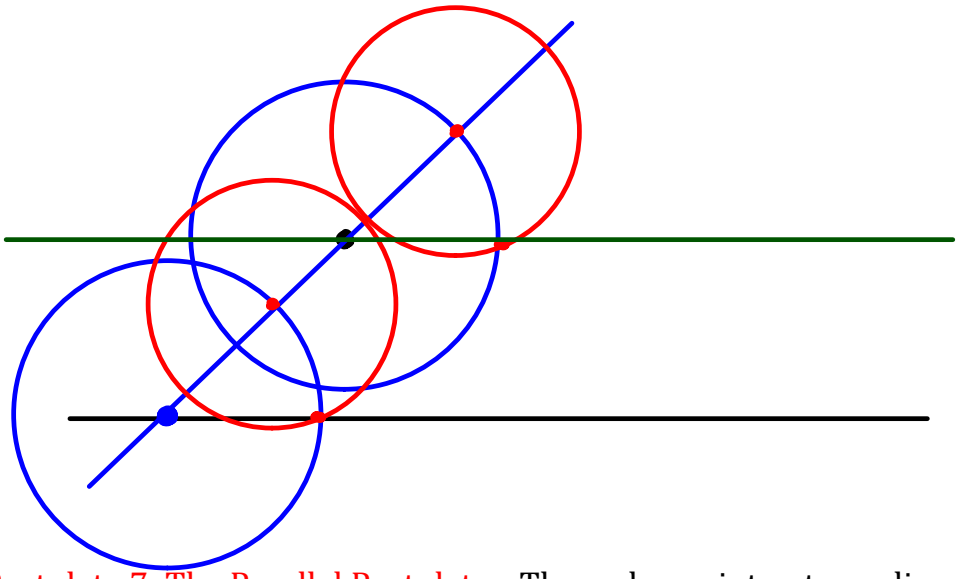


Proof:

Statements	Reasons
1. AE=AD & ∠E=∠BCE	Given
2. ∠E=∠ADE	If two sides of a △ are equal, the angles opposite them are equal
3. ∠ADE=∠BCE	Substitution
4. AD ∥ BC	If corresponding angles are equal, lines are parallel

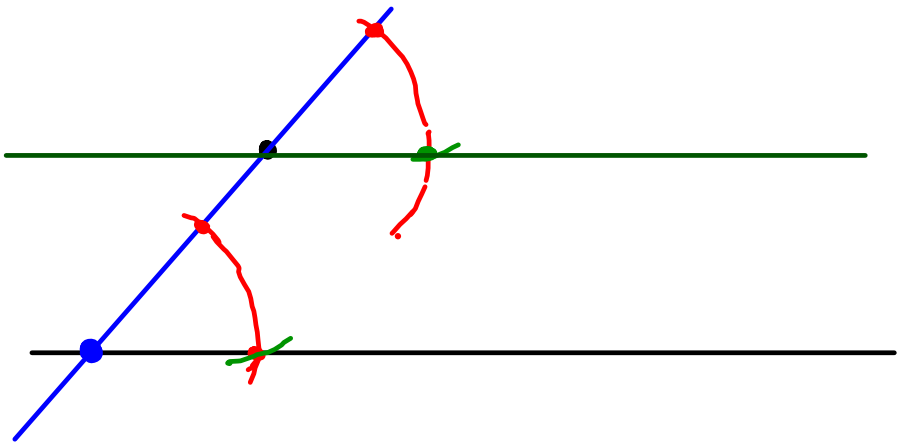
6.3 – The Parallel Postulate

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



Postulate 7: 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.



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 (due Friday, 12/5)
- Read Ch 5 & Ch 6
- **Ch 5 Review Problems pp. 206-209**
- Start working on Ch 6 Review Problems (not due until Fri. 12/12)
- Work toward mastery of practiced Khan Academy exercises in "Introduction to Euclidean Geometry," "Angles and Intersecting Lines," and "Congruence"

Quiz #2 - Friday, 12/5