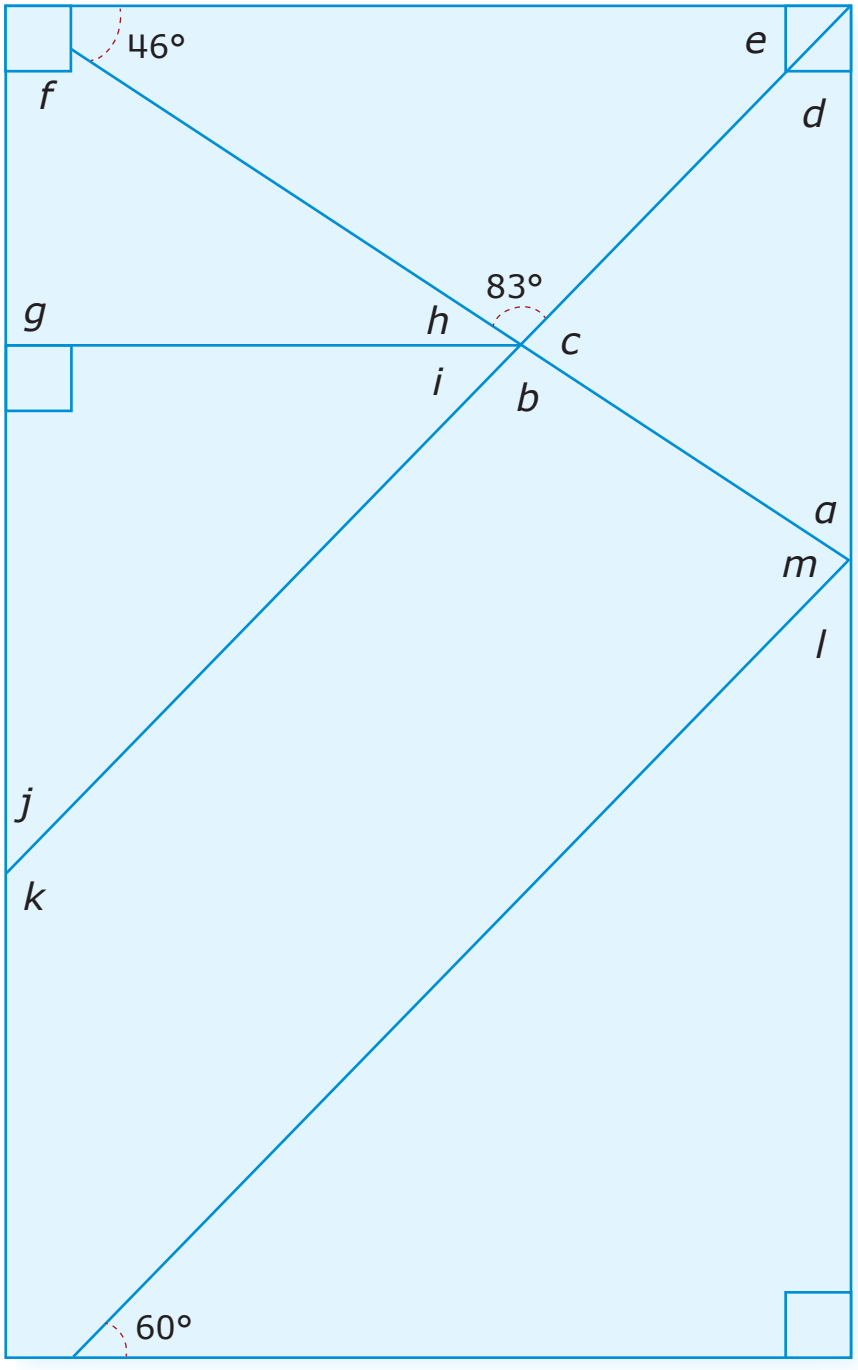
TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

Angles Puzzle 1

Use your *thinking skills* to find the missing angles and record in degrees below. Figures are ***not*** to scale, so do not measure.



a _____ *b* _____ *c* _____ *d* _____ *e* _____ *f* _____ *g* _____

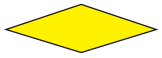
h _____ *i* _____ *j* _____ *k* _____ *l* _____ *m* _____

Quadrilateral Matching

Match the quadrilateral with its properties. You may use an answer more than once.

1. Rectangle 

_____

2. Rhombus 

_____

3. Parallelogram 

_____

4. Kite 

_____

5. Trapezoid 

_____

6. Isosceles Trapezoid 

_____

7. Square 

_____

a. Diagonals are congruent.

b. Opposite sides are congruent.

c. Opposite angles are congruent.

d. Consecutive angles are supplementary.

e. Diagonals are perpendicular.

f. All sides are congruent.

g. All angles are congruent.

h. Sum of the angle measures equals 360°.

Chapter 8 - Geometric Constructions

A Geometric Construction

A geometric construction is a construction done with only a compass and a straightedge. Of course, a good pencil is important. In a classic geometric construction, you are ***not*** allowed to measure or erase. If you make a mistake, it's best you start over.

Before we problem solve and do some *fun thinking* problems with constructions, it is a good idea to review how to do these constructions.

- Bisecting an angle.
- Copying an angle.
- Constructing a perpendicular bisector to a line.
- Constructing a perpendicular bisector to a line from a point on the not on the line.
- Constructing a line parallel to another line through a given point.
- Constructing some popular polygons.

Note

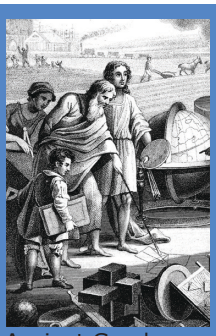
My constructions are actual drawings since they were done on the computer, but if you follow the directions for each of these, you will make *perfect* constructions.

Geometric constructions are used by engineers and designers. They will help you see the beauty of geometry.

For fun, create your own design with a compass and a straightedge. Try to fill up a page of paper with your own design.

Problem-Solving With Geometric Constructions (Cont.)

Plato (*428-347 BC*), a famous Greek philosopher and mathematician, discovered that many constructions can be made with only a compass and no straightedge. Those constructions are now called Mascheroni constructions in honor of Italian mathematician Lorenzo Mascheroni (1750-1800) who wrote a book called *The Geometry of Compasses*.



Ancient Greek philosopher drawing his theorem in the sand.

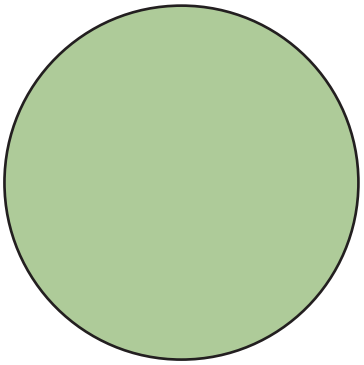
7 Using *only* a compass, given segment **AB**, construct segments that are 2, 3, and 4 times bigger than **AB**.

A **B**

Remember
You ***cannot*** use a straightedge so you can only show the points that mark such distances.

8 I lost the center of *My Circle* construction below. If you draw a circle and forget where the center is, draw two non-parallel chords. Construct the perpendicular bisectors of each chord and where the perpendicular bisectors meet is your missing center. Try it!

Hint
Once you find the center, make two triangles. Use the center as one point, and the points where the chord and the circle intersect to help you see what is happening.



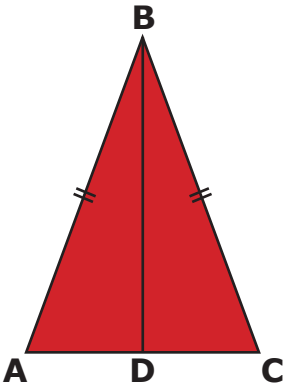
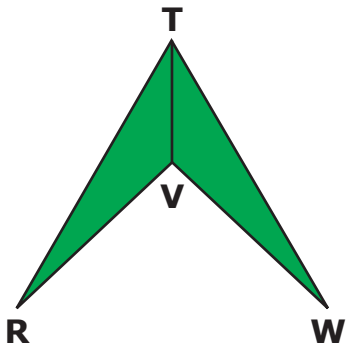
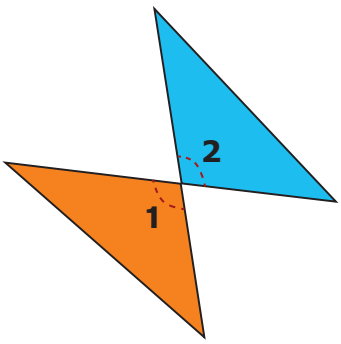
Why does this work? Explain your thinking. _____

_____

_____

Picture, Statement, and Reason

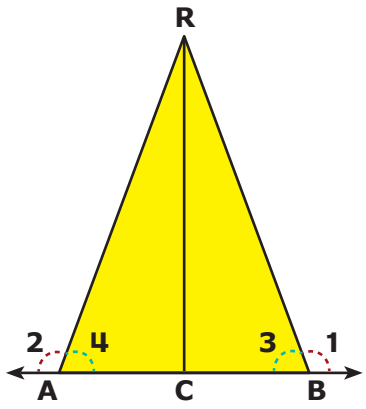
Refer to the picture and write a reason for each statement.

	Statement	Reason
1 	a $\overline{AB} \cong \overline{CB}$	a Given (The fact is stated in the picture or in the information.)
	b $\angle A \cong \angle C$	b _____ _____ _____
2 	a $\overline{TV} \cong \overline{TV}$	a _____ _____ _____
3 	a $\angle 1 \cong \angle 2$	a _____ _____ _____

Two Column Proofs (Cont.)

Refer to the picture and fill in the missing reasons or statements for each proof.

Proof 3

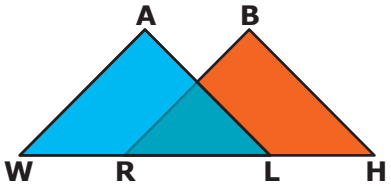


Given: $\overline{RC} \perp \overline{AB}$ and $\overline{AC} \cong \overline{BC}$

Prove: $\angle 1 \cong \angle 2$

	Statement	Reason
1	_____	1 Given
2	_____	2 Given
3	$\angle ACR$ and $\angle BCR$ are right angles.	3 _____
4	_____	4 All right angles are congruent
5	$\overline{RC} \cong \overline{RC}$	5 _____
6	$\Delta ACR \cong \Delta BCR$	6 _____
7	$\angle 3 \cong \angle 4$	7 _____
8	$\angle 1 \cong \angle 2$	8 _____

Proof 4



Given: $\overline{WR} \cong \overline{HL}$, $\angle W \cong \angle H$, $\angle ALW \cong \angle BRH$

Prove: $\angle \Delta AWL \cong \Delta BHR$ and $\angle A \cong \angle B$

	Statement	Reason
1	_____	1 Given
2	_____	2 Given
3	_____	3 Given
4	$\overline{RL} \cong \overline{RL}$	4 _____
5	$\overline{WL} \cong \overline{HR}$	5 _____
6	$\angle \Delta AWL \cong \Delta BHR$	6 _____
7	$\angle A \cong \angle B$	7 _____