Objective # 8 **Congruent Triangles**

Material: page 212 to 220

Homework # 1: Crossword Puzzle on Vocabulary for Triangle Proofs

Homework # 2:` worksheet # 2

NOTE: This objective is ongoing and material will be added as the semester moves along!

Congruent Triangles
Worksheet # 2

1. What are congruent triangles?

2. Visit the site: http://ia.usu.edu/viewproject.php?project=ia:3006

   NOTE: you may have to download a java plugin for your Internet browser for this to work

   Go to the activity on congruent triangles. In this activity you are will be able to construct two triangles from various combinations of sides and angles. You can choose to work with any one of four different cases SSS, SAS, ASA, SSA. Note: Which of these can not be used to prove two triangles congruent.

3. Describe the three ways used in the above activity to prove two triangles congruent.

4. There is a special case for proving two right angle triangles congruent. Describe this case.

5. Draw four sets of congruent triangles that demonstrate the four ways to prove the two triangles congruent.

This worksheet must be completed and passed in by next double math class.

Congruent Triangles
Worksheet # 3

1. What does **CPCTC** stand for when working with congruent triangles?

2. What symbol is used when naming the congruent triangles or naming the parts that are congruent?

3. In each of the following diagrams:

   a) identity the method that would proves the two triangles congruent.
   (i.e. **SAS**, **SSS**, **ASA** or **Hl**)

   b) Name the triangles that are congruent. (NOTE: The order in which you write the letters for the triangles must be in the order of the congruent parts)

   c) Name the corresponding parts that are congruent.

Fig 1:

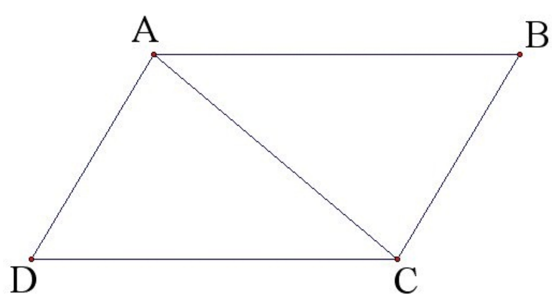


Fig 2:

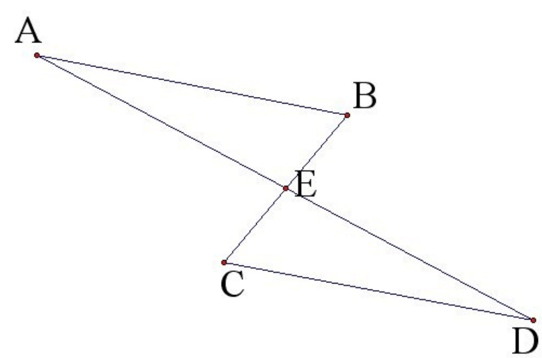


Fig 3:

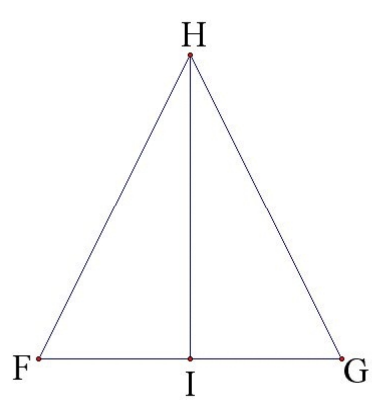
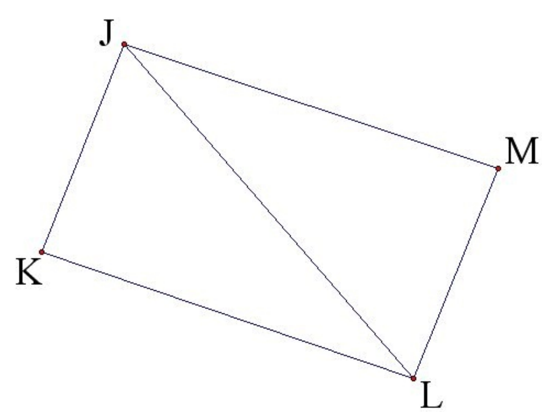


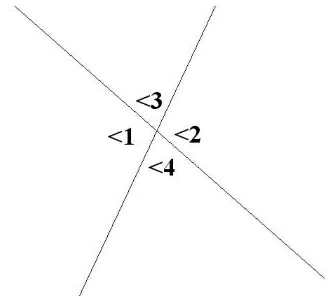
Fig 4:



Congruent Triangles
Worksheet # 4

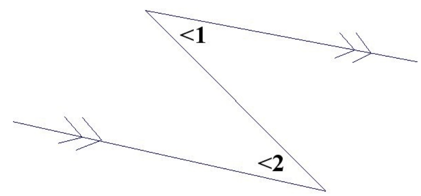
Properties used to help prove triangles congruent:

Vertical angles are congruent:
Two angles opposite each other in two intersecting lines .. not necessarily vertical!



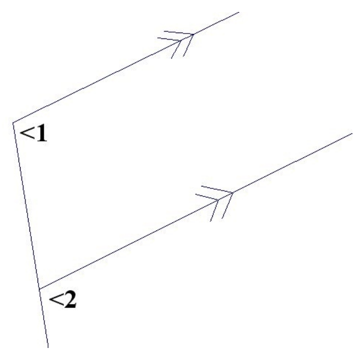
In the diagram: $\angle 1 \cong \angle 2$
$\angle 3 \cong \angle 4$

Z-pattern angles are congruent:
Two angles formed when parallel lines are cut by a transversal to form a z-pattern.



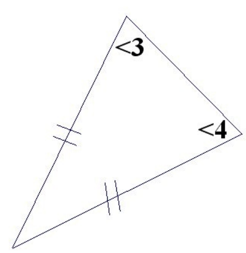
In the diagram: $\angle 1 \cong \angle 2$

F-pattern angles are congruent:
Two angles formed when parallel lines are cut by a transversal to form an f-pattern.



In then diagram: $\angle 1 \cong \angle 2$

Base angles in an isosceles triangle are congruent:
Two angles opposite the equal sides in an isosceles triangle



In the diagram: $\angle 3 \cong \angle 4$

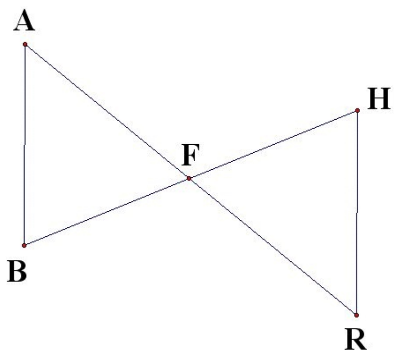
A-B-C-D-X-Y ***means that these points are collinear (all lie on the same line)***

Supplementary angles: ***two angles whose measures add up to 180º.***

Proofs: ***a logical reasoning process where you make a statement and back it up with a mathematical fact.***

Example 1: Given: $\overline{AB} // \overline{RH}$ and $\overline{AB} \cong \overline{RH}$

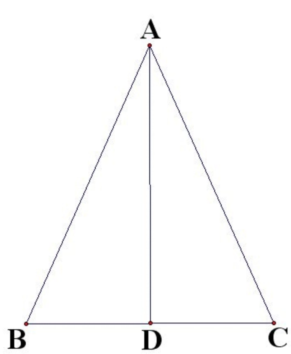
Prove: $\Delta ABF \cong \Delta RHF$



Statements	Reasons

Example 2: Given: $\overline{AB} \cong \overline{AC}$ and D is the mid-point of $\overline{BC}$

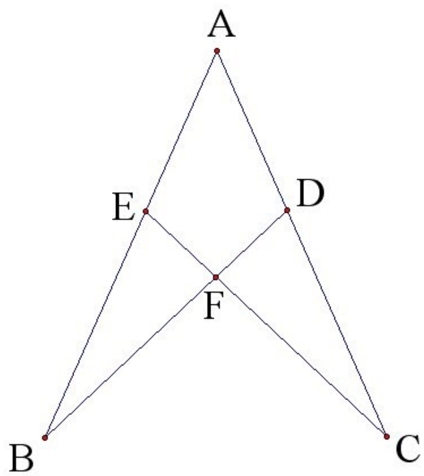
Prove: $\angle BAD = \angle CAD$



Statements	Reasons

Example 3: Given: **B-E-A** ; **C-D-A**; $\overline{AE} \cong \overline{AD}$; $\overline{EB} \cong \overline{DC}$

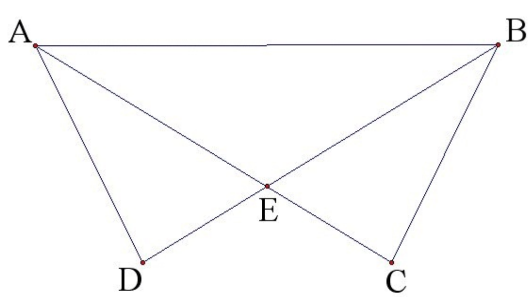
Prove: $\angle B \cong \angle C$



Statements	Reasons

Example 4: Given: **A-E-C**; **B-E-D**; $\overline{DE} \cong \overline{EC}$; $\overline{EB} \cong \overline{EA}$

Prove: $\Delta DBA \cong \Delta CAB$

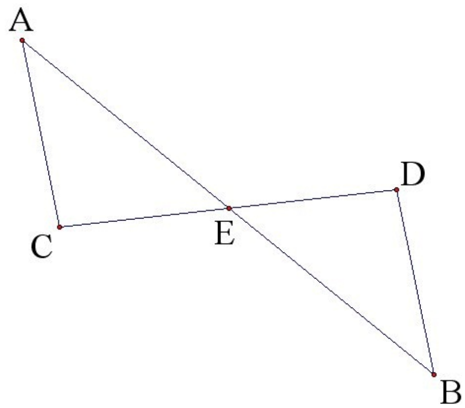


Statements	Reasons

Exercise: **Write Proofs for each of the following and assume all lines that look straight are straight!**

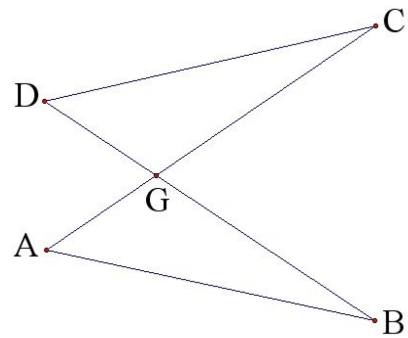
1. Given: $\overline{AB}$ and $\overline{CD}$ bisect each other at E

   Prove: $\overline{AC} \cong \overline{DB}$



2. Given: $\overline{GC} \cong \overline{GB}$; $\angle C \cong \angle B$

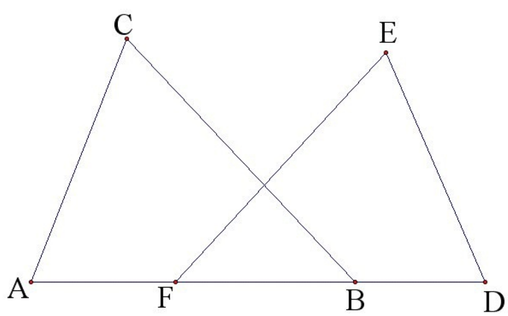
   Prove: $\overline{AG} \cong \overline{DG}$



3. Given: $\overline{AC} \cong \overline{DE}$; $\overline{AB} \cong \overline{DF}$;

   $\angle CAB \cong \angle EDF$

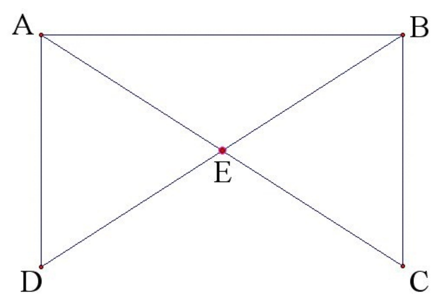
   Prove: $\overline{CB} \cong \overline{EF}$



4. Given: $\overline{DA} \perp \overline{AB}$; $\overline{CB} \perp \overline{AB}$

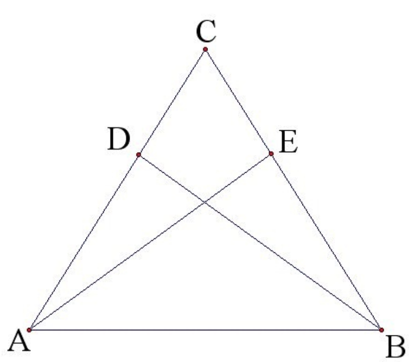
   $\angle DBA \cong \angle CAB$

   Prove: $\overline{BD} \cong \overline{AC}$



5. Given: $\overline{AC} \cong \overline{BC}$; $\angle CAE \cong \angle CBD$

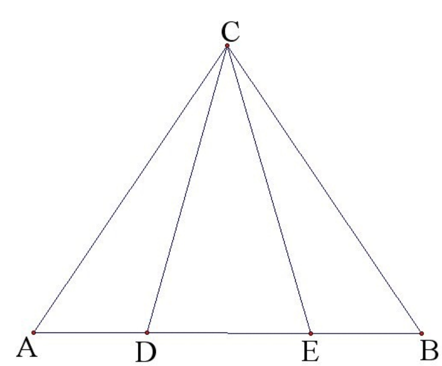
   Prove: $\overline{CD} \cong \overline{CE}$



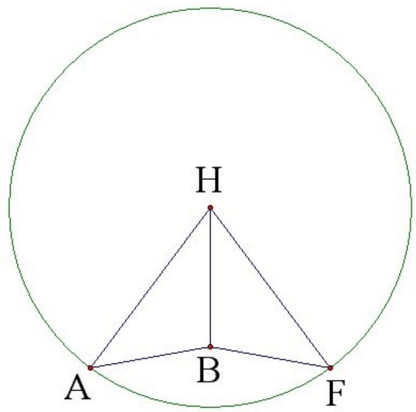
6. Given: $\overline{AC} \cong \overline{BC}$; $\overline{DC} \cong \overline{EC}$

   $\overline{AD} \cong \overline{BE}$

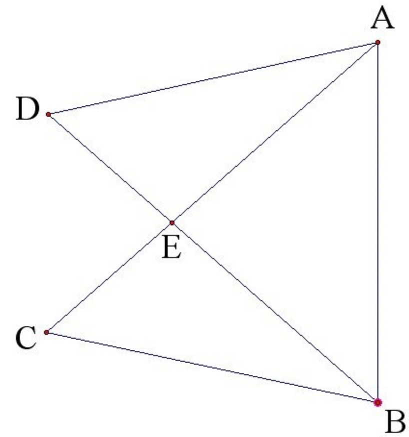
   Prove: $\angle ACE \cong \angle BCD$



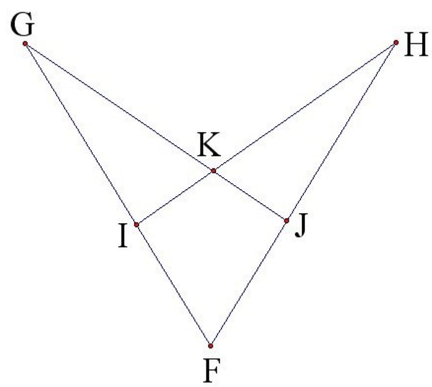
7. Given: circle with center at **H**;
$\angle \mathbf{AHB} \cong \angle \mathbf{FHB}$
Prove: $\angle \mathbf{A} \cong \angle \mathbf{F}$



8. Given: $\overline{\mathbf{DE}} \cong \overline{\mathbf{CE}}$; $\overline{\mathbf{EA}} \cong \overline{\mathbf{EB}}$
Prove: $\mathbf{\Delta DAB} \cong \mathbf{\Delta CBA}$



9. Given: $\overline{\mathbf{GI}} \cong \overline{\mathbf{HJ}}$; $\mathbf{FI} \cong \mathbf{FJ}$
Prove: $\overline{\mathbf{GJ}} \cong \overline{\mathbf{HI}}$



10. Given: **D-B-E**; $\overline{\mathbf{DE}} \,/\!/\, \overline{\mathbf{AC}}$
Prove: The sum of the 3 angles in $\mathbf{\Delta ABC}$ is **180º**