

Chapter 4

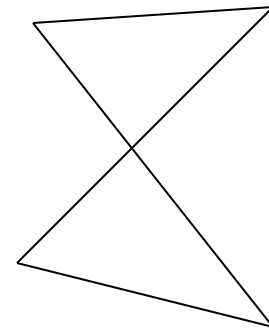
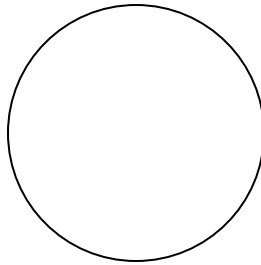
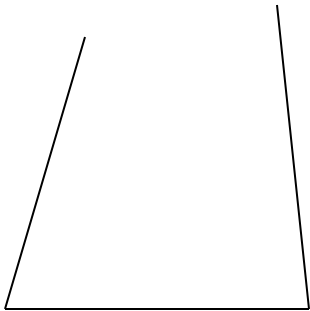
Identifying Congruent Triangles

4-1

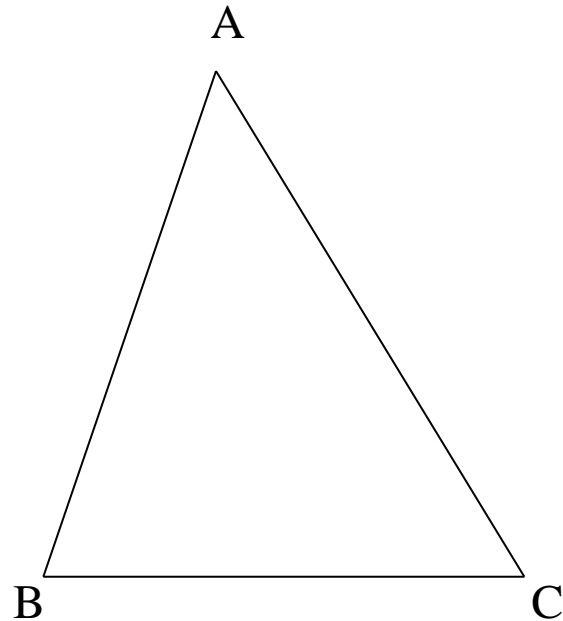
Classifying Triangles

Polygons

- A closed figure that is made up segments (sides) that intersects only at the endpoints (vertices).



Triangles



A three-sided polygon

- Name:
- Sides:
- Vertices:
- Angles:

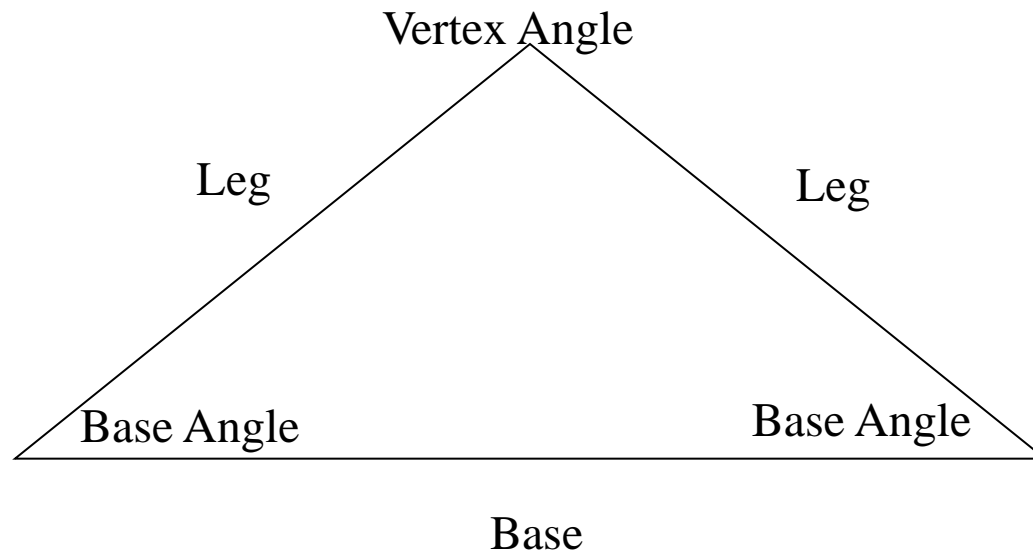
Classifying Triangles by Angles

- Acute Triangle—Three acute angles
- Right Triangle—One right angle
- Obtuse Triangle—One obtuse angle
- Equiangular—three congruent angles

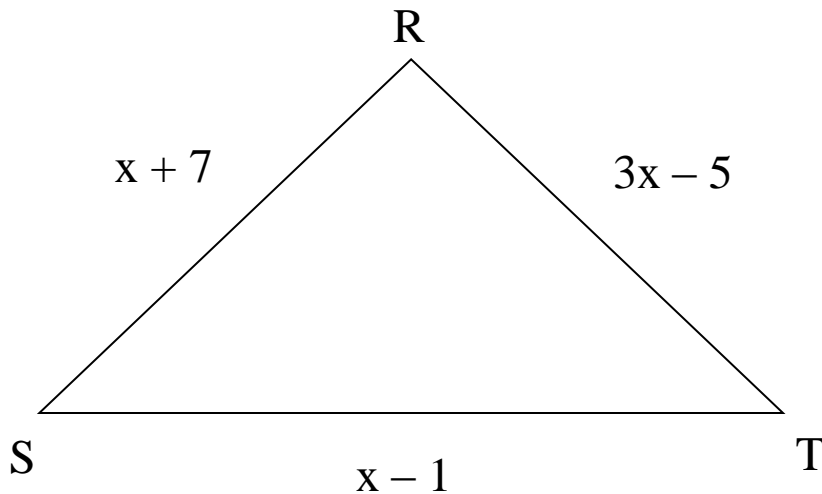
Classifying Triangles by Sides

- Scalene—no two sides are congruent
- Equilateral—all three sides are congruent
- Isosceles—at least two sides are congruent

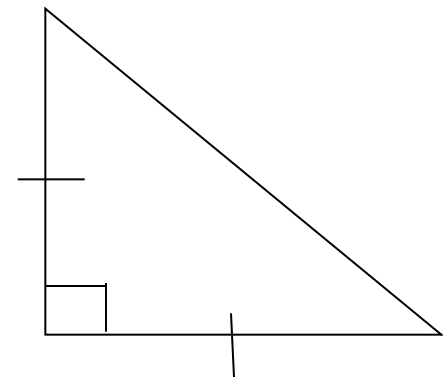
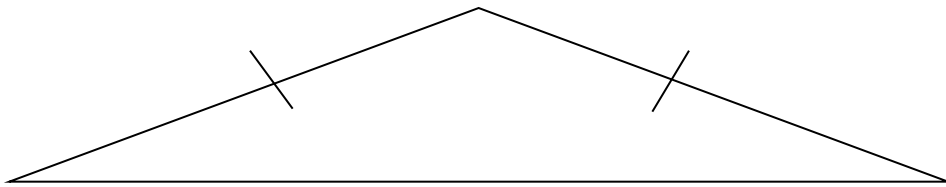
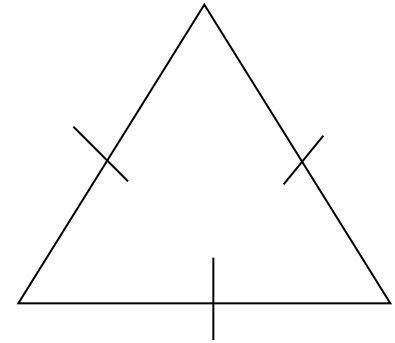
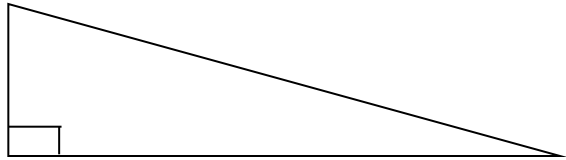
Parts of Isosceles Triangle



 $\triangle RST$ is an isosceles triangle with vertex $\angle R$. Find x , RS , ST , and RT .



Classify the each triangle by its sides and its angles.



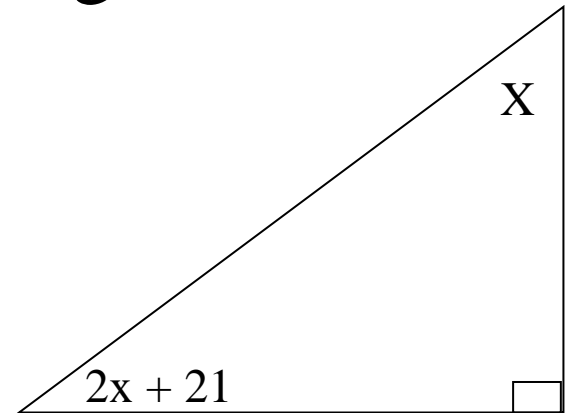
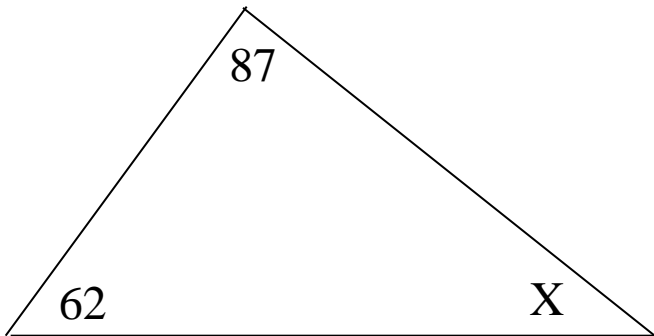
#33 Use the distance formula to classify $\triangle PQR$ with P (0, 6), Q (3, 6), R(3, 0).

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Measuring Angles in Triangles

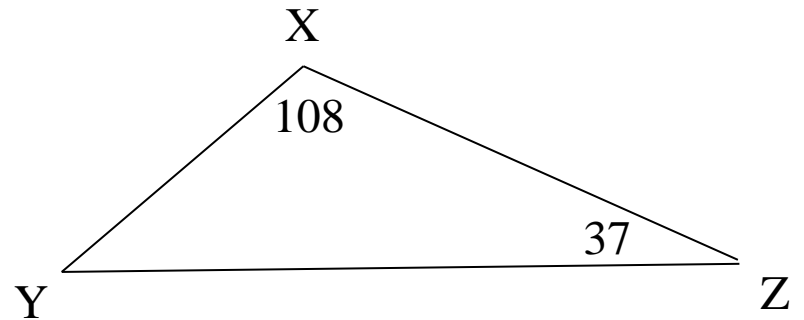
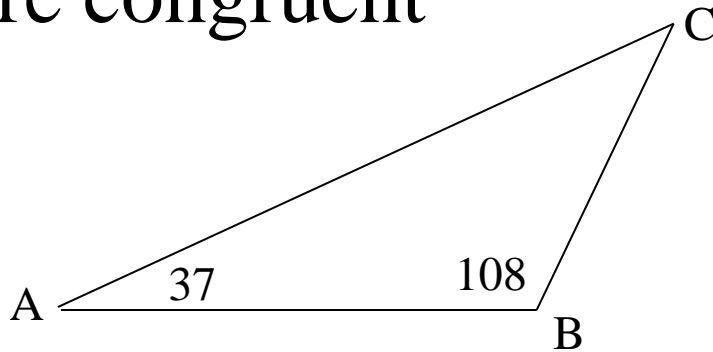
Angle Sum Theorem:

- The sum of the angles of a triangle is 180 degrees.

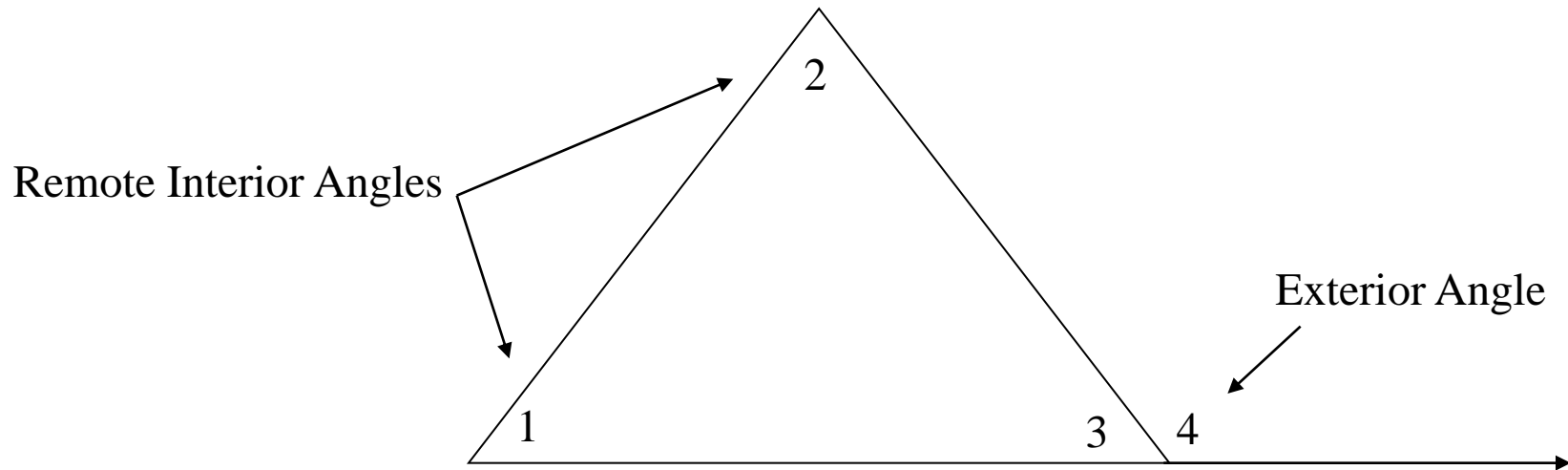


Third Angle Theorem:

- If 2 angles of one triangle are congruent to 2 angles of another triangle, then the 3rd angles are congruent

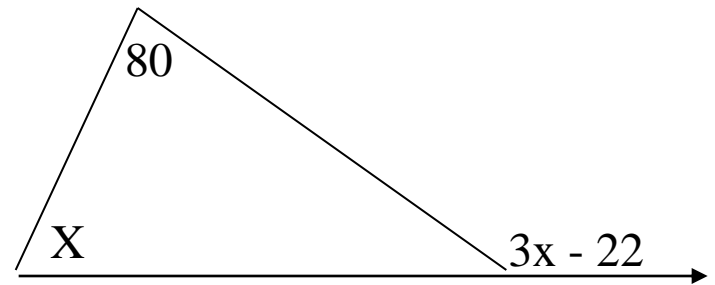
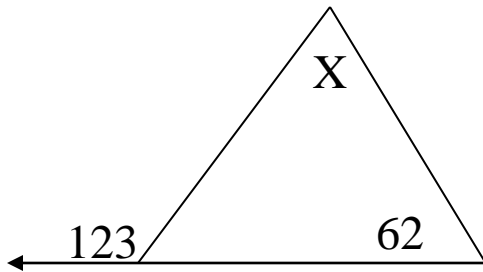


Exterior and Remote Interior Angles

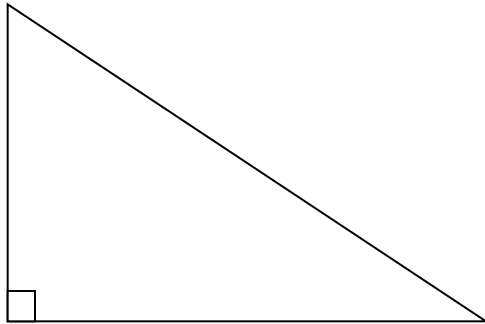


Exterior Angle Theorem:

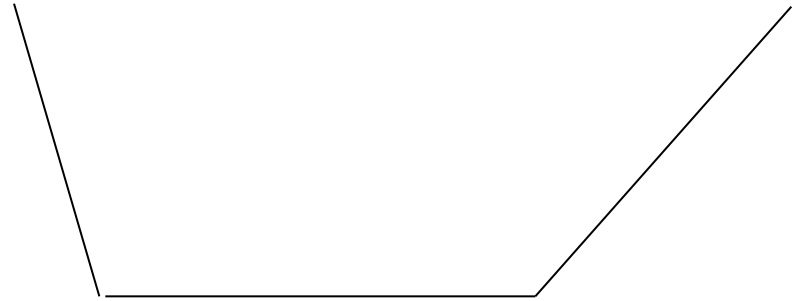
- The measure of the exterior angle of a triangle is equal to the sum of the two remote interior angles.



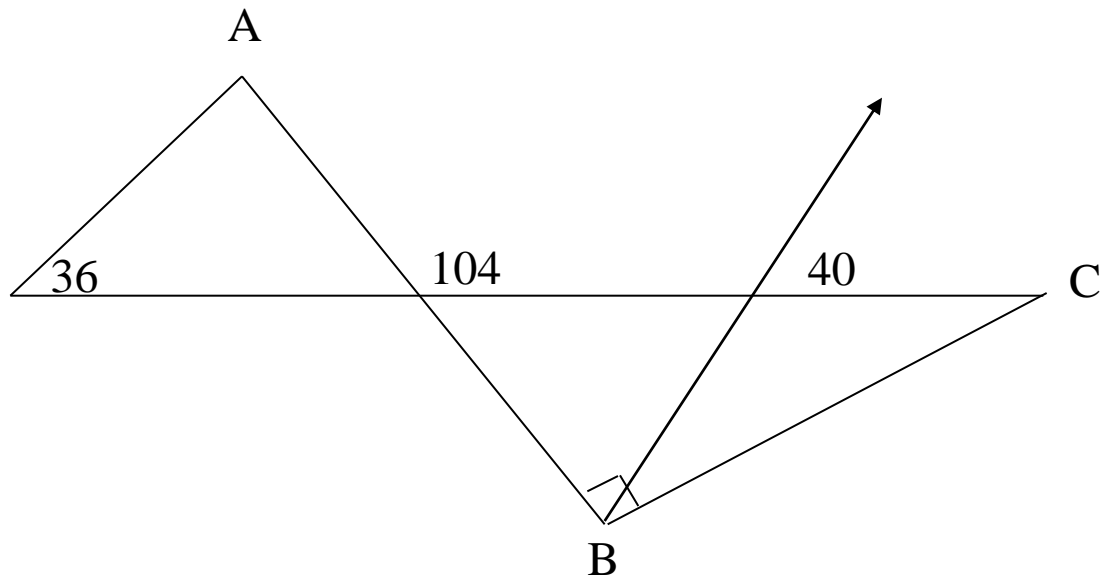
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- (Corollary 4-1) The acute angles of a right triangle are complementary.



- (Corollary 4-2) There can be at most one right or obtuse angle in a triangle.



\overline{AB} is perpendicular to \overline{BC}

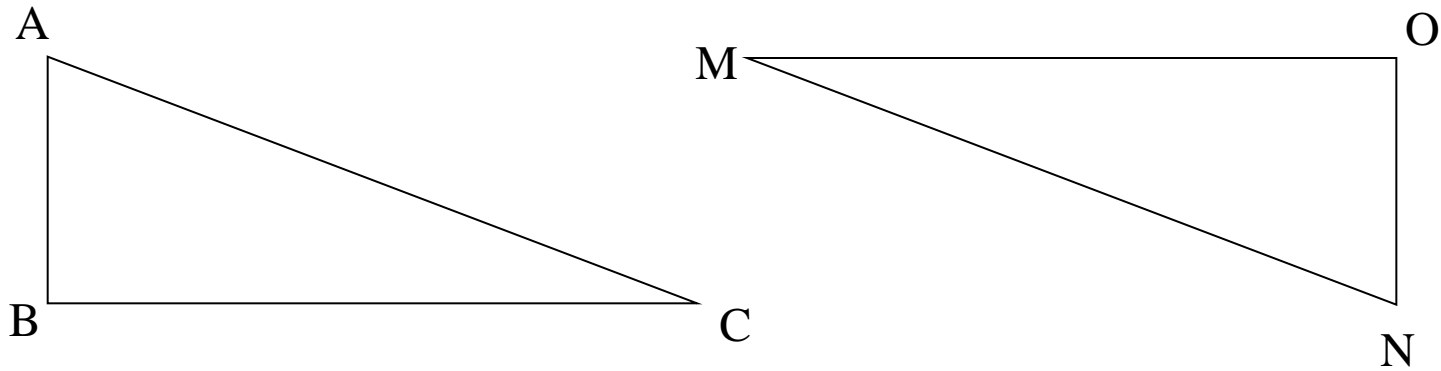


4-3

Exploring Congruent Triangles

Congruent Triangles:


- Triangles with the exact same size and shape.



- All six (3 angles, 3 sides) triangle parts need to be congruent for the triangles to be congruent.

Definition of Congruent Triangles:

- 2 Triangles are congruent iff their corresponding parts are congruent
- (CPCTC) **C**orresponding **P**arts of **C**ongruent **T**riangles are **C**ongruent



#17 $\triangle PQR \cong \triangle RST$

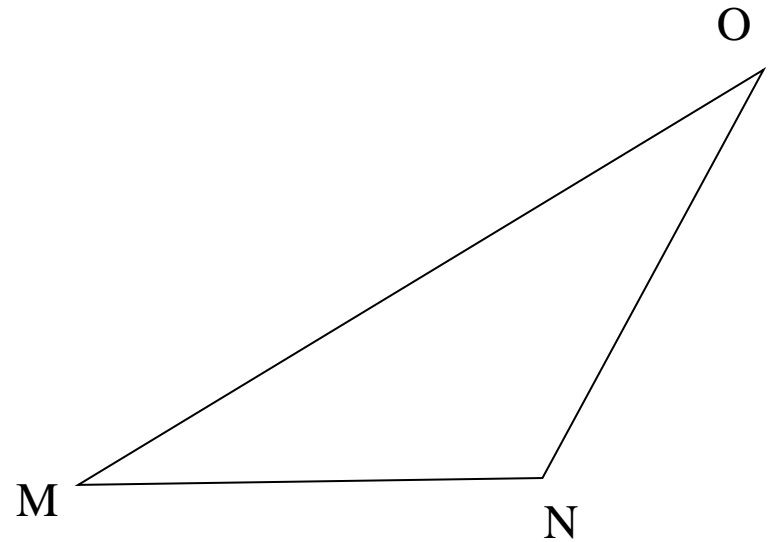
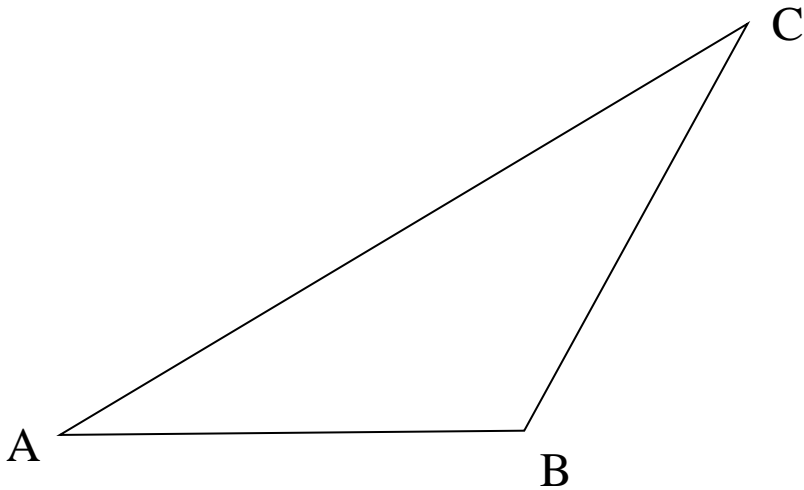
#18 $\triangle EGO \cong \triangle PGO$

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Proving Triangles Congruent

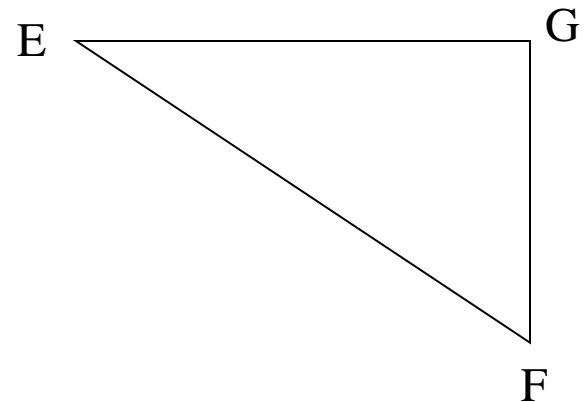
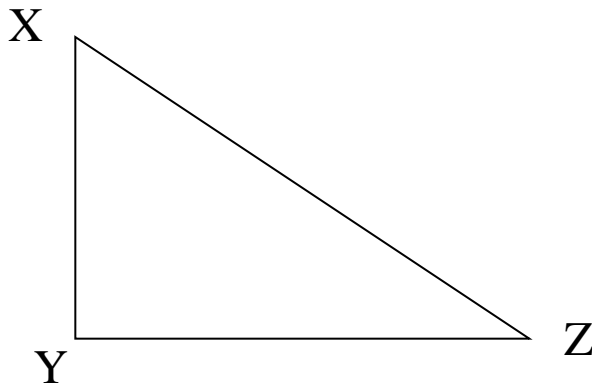
SSS Postulate:

- If the sides of one triangle are congruent to the sides of another triangle, then the two triangles are congruent.



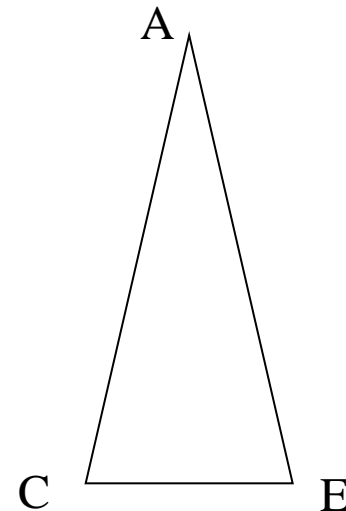
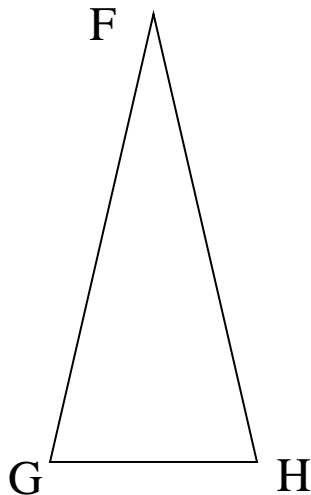
SAS Postulate:

- If two sides and the included angle of one triangle are congruent to the corresponding parts of another triangle, then the two triangles are congruent.

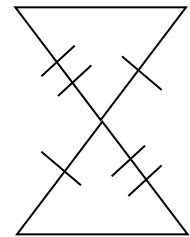
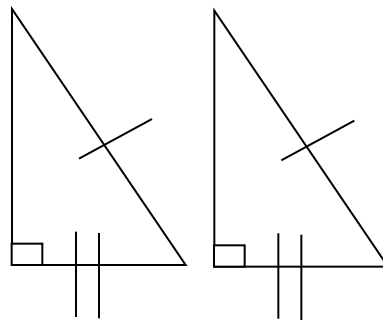
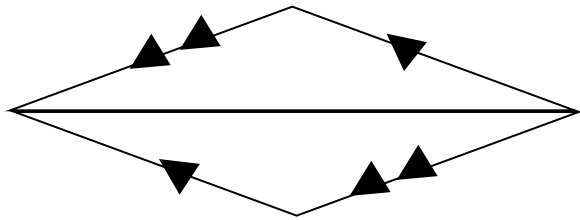
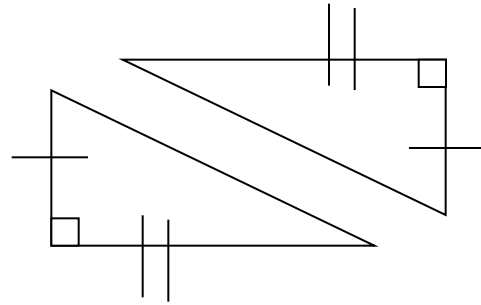
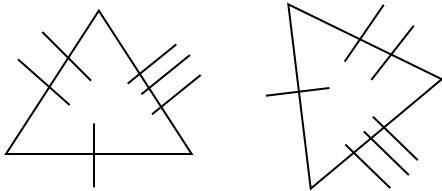


ASA Postulate:

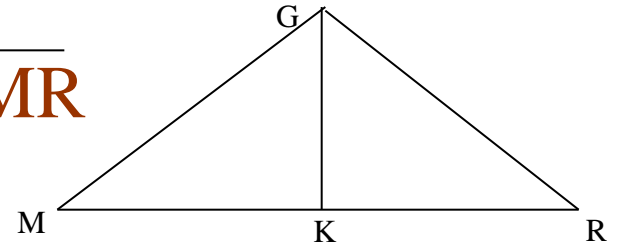
- If two angles and the included side of one triangle are congruent to the corresponding parts of another triangle, then the two triangles are congruent.



Name the postulate used to prove the triangles congruent.



#28 Given: $\overline{GK} \perp \overline{MR}$, \overline{GK} bisects \overline{MR}
Prove: $\triangle MKG \cong \triangle RGK$

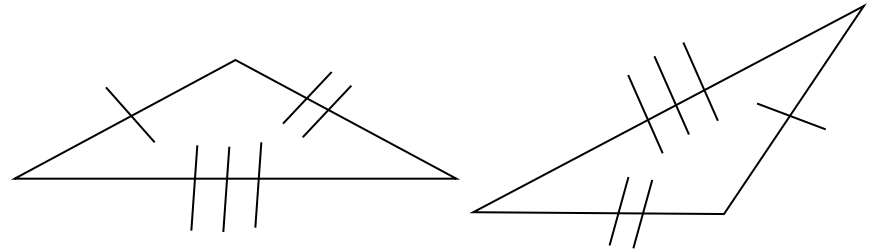


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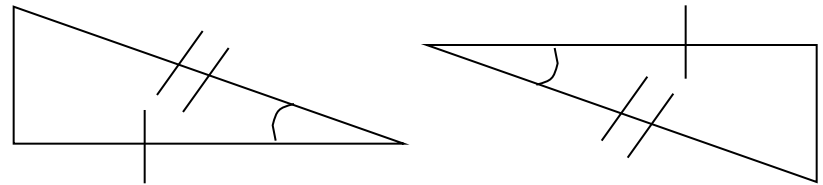
More Congruent Triangles

Triangles can be congruent using one of three postulates:

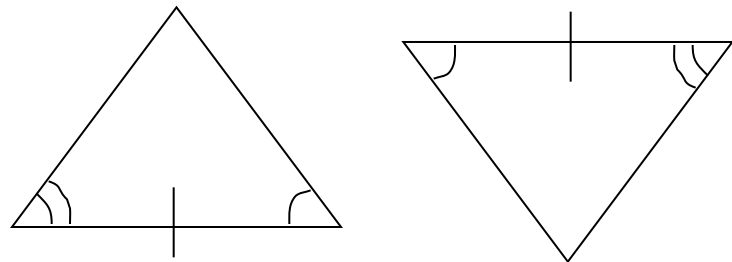
□ Side-Side-Side



□ Side-Angle-Side

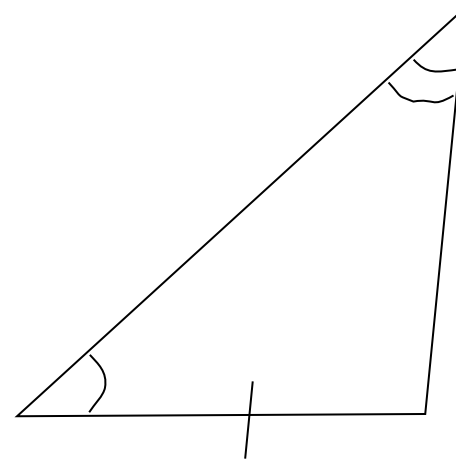
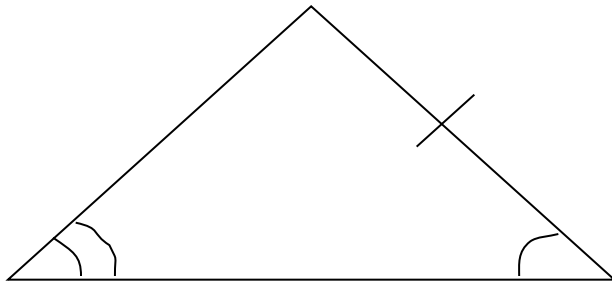


□ Angle-Side-Angle

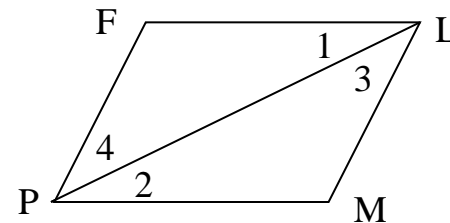


AAS Theorem:

- If two angles and the nonincluded side of one triangle are congruent to the corresponding parts of another triangle, then the triangles are congruent.



#32 Given: $\angle F \cong \angle M$, $\angle 1 \cong \angle 2$
Prove: $\overline{FP} \cong \overline{ML}$

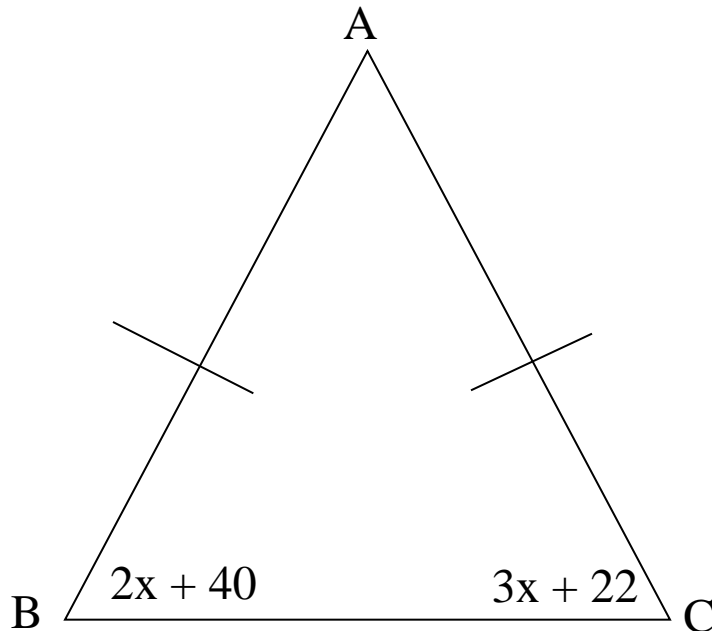


4-6

Analyzing Isosceles Triangles

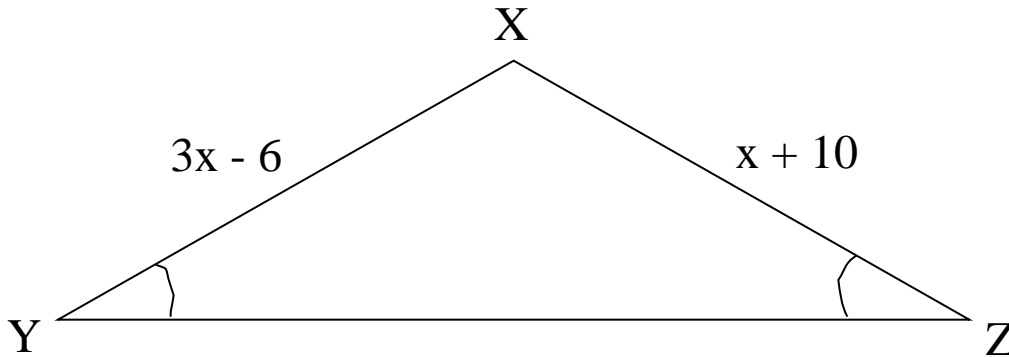
Isosceles Triangle Theorem:

- If two sides of a triangle are congruent, then the angles opposite those sides are congruent.



The converse of the Isosceles Triangle Thm is also true:

- If two angles of a triangle are congruent, then the sides opposite those angles are congruent.



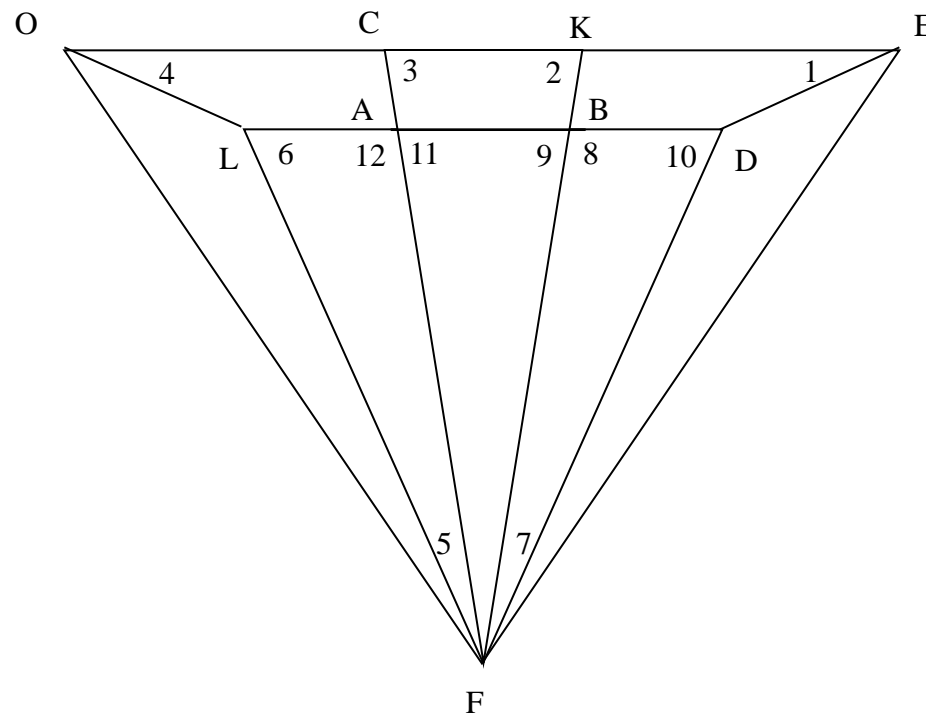
Refer to the figure for #15-23

17. $\overline{FA} \cong \overline{FB}$

19. $\overline{FO} \cong \overline{FE}$

21. $\angle EOF \cong \angle EFO$

23. $\angle 12 \cong \angle 8$



#37 Given: $\angle 5 \cong \angle 6$, $\overline{FR} \cong \overline{GS}$
Prove: $\angle 4 \cong \angle 3$

