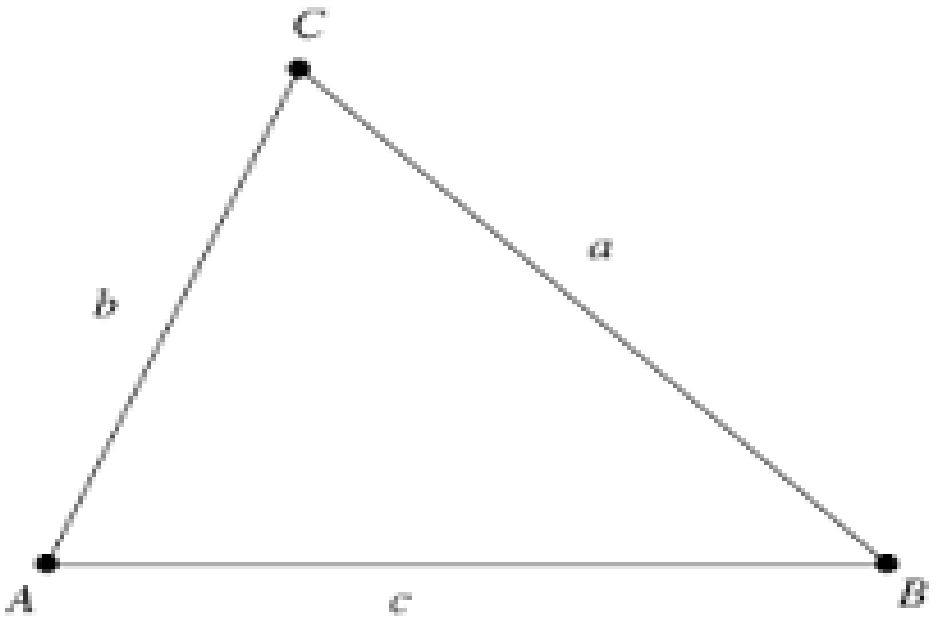
Chapter 4
Congruent Triangles

4.1
Apply Triangle Sum Properties

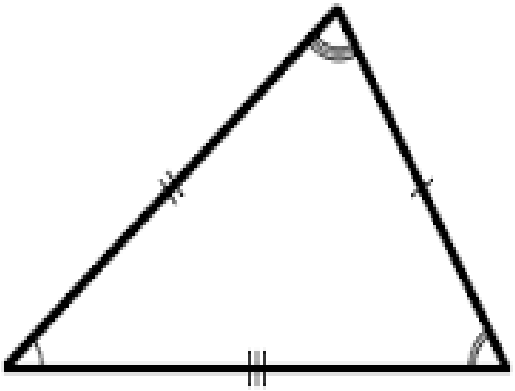
Triangle

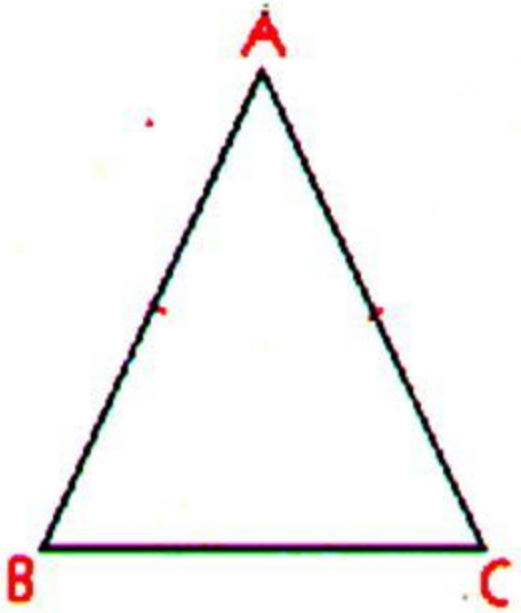
* A shape with _____.

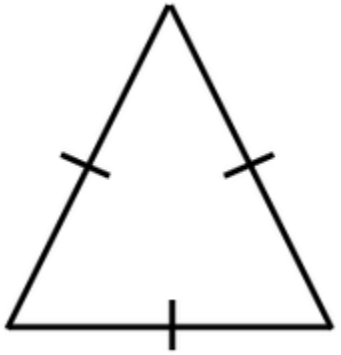


Classify Triangles by SIDE:

* Scalene: _____
* Isosceles: _____
* Equilateral: _____

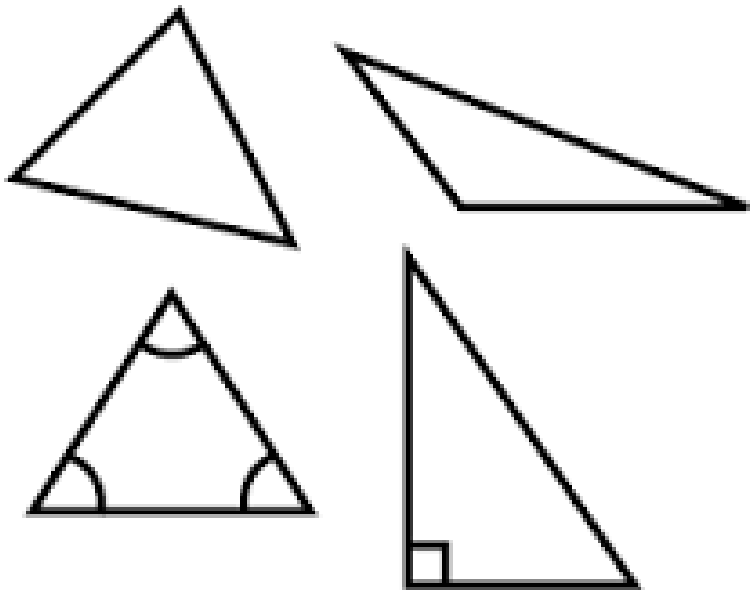




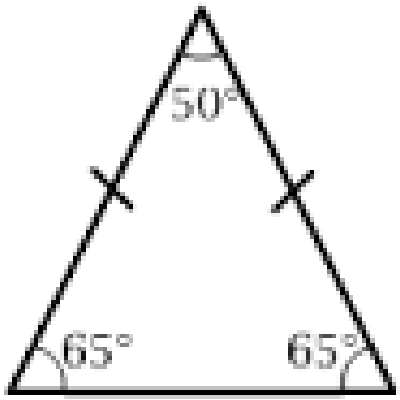


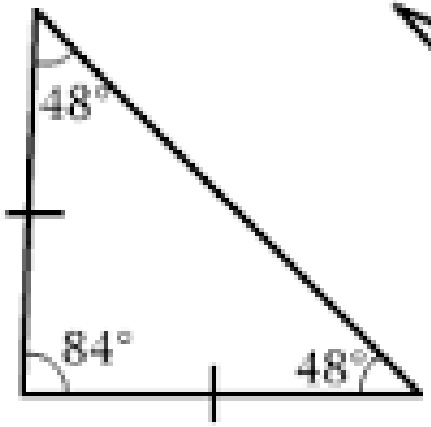
Classify Triangles by ANGLE:

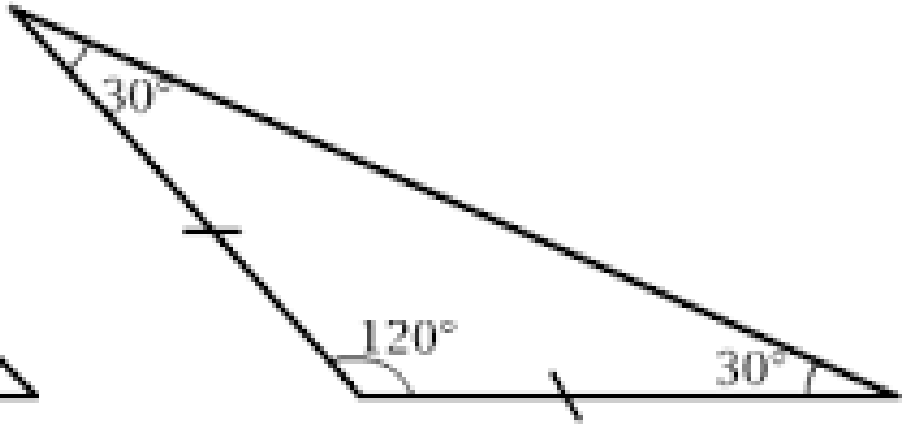
* Acute: _____
* Right: _____
* Obtuse: _____
* Equilateral: _____



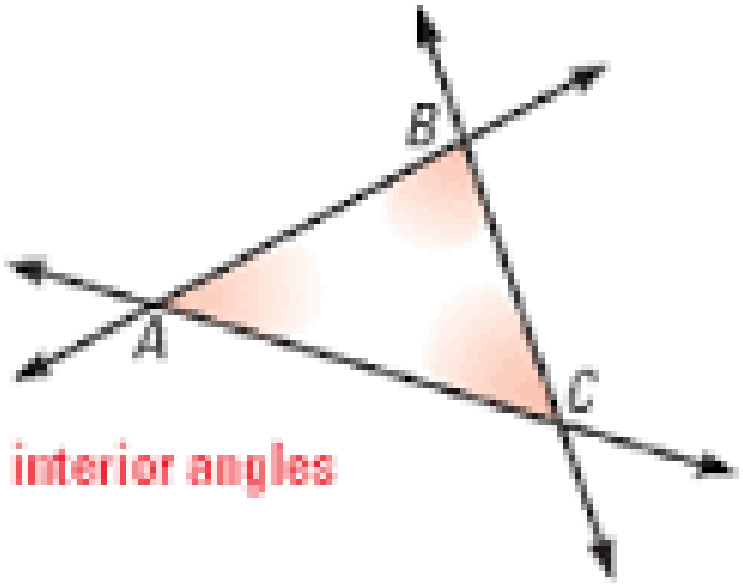
EX: Classify the triangles by sides and angles.



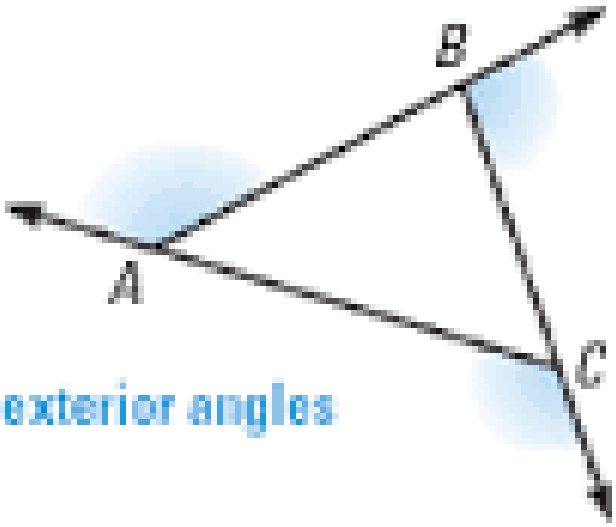




Interior and Exterior Angles



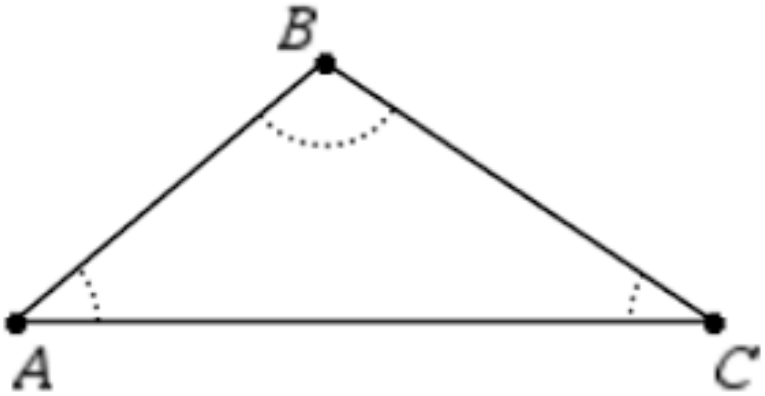
interior angles



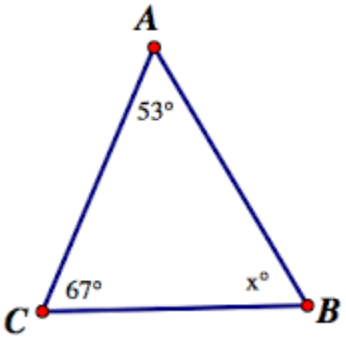
exterior angles

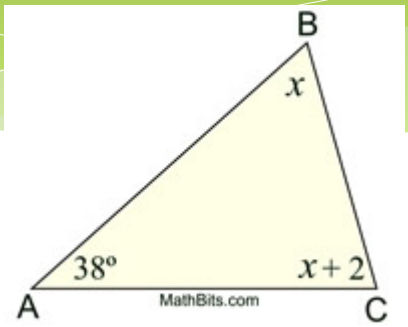
Triangle Sum Theorem

* The _____ in a triangle _____.



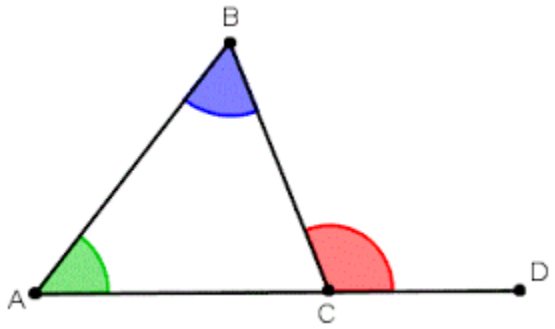
EX: Find x. Then classify then classify the triangle by its angles.

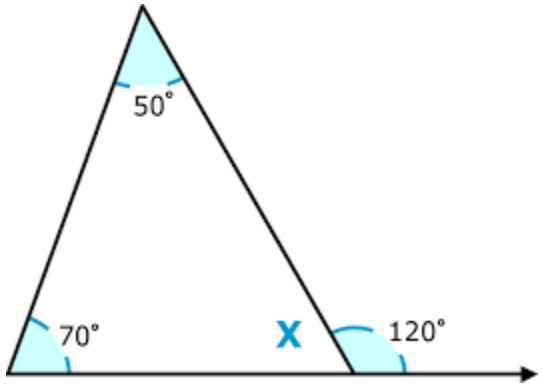




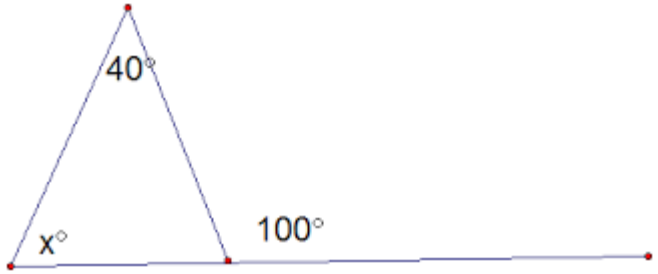
Exterior Angle Theorem

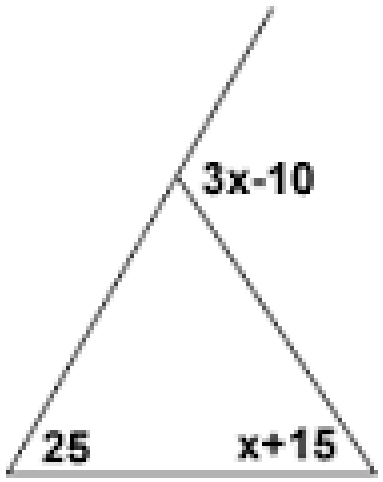
* The measure of an _____ of a triangle_____ the _____ two _____.





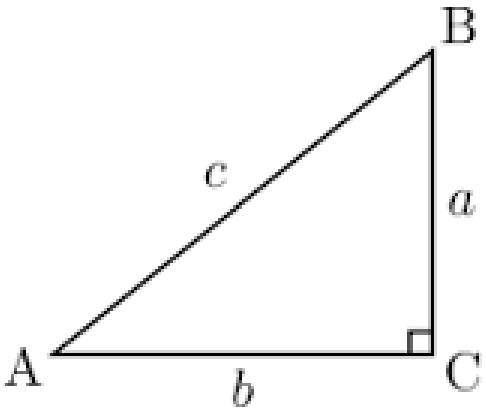
EX: Solve for x. Then tell the value of the exterior angle.

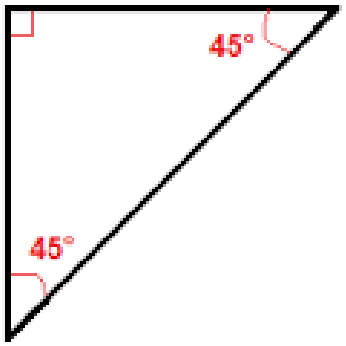


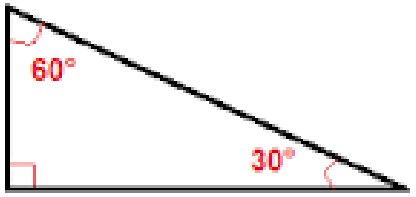


Right Triangle Angles

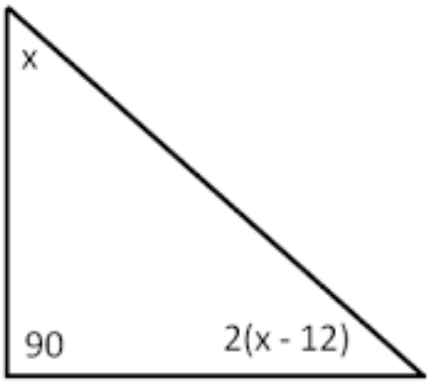
* The _____ in a right triangle are _____.





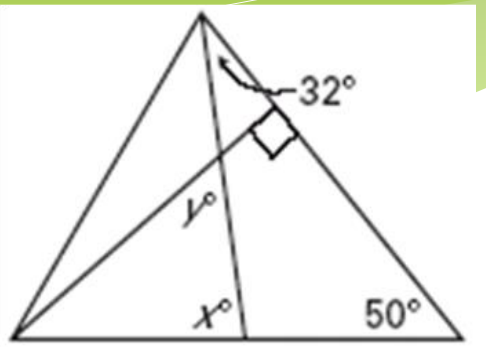


EX: Find the measures of the acute angles in the right triangle shown.



EX:

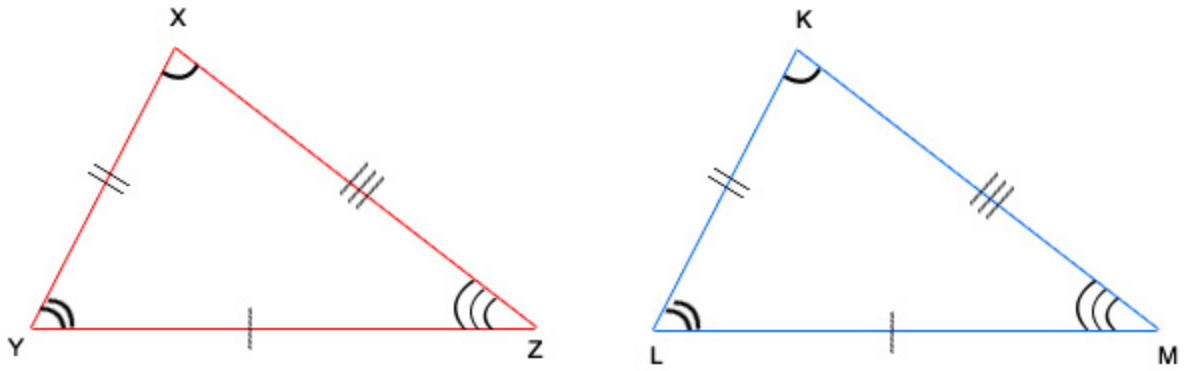
4. Find x and y.



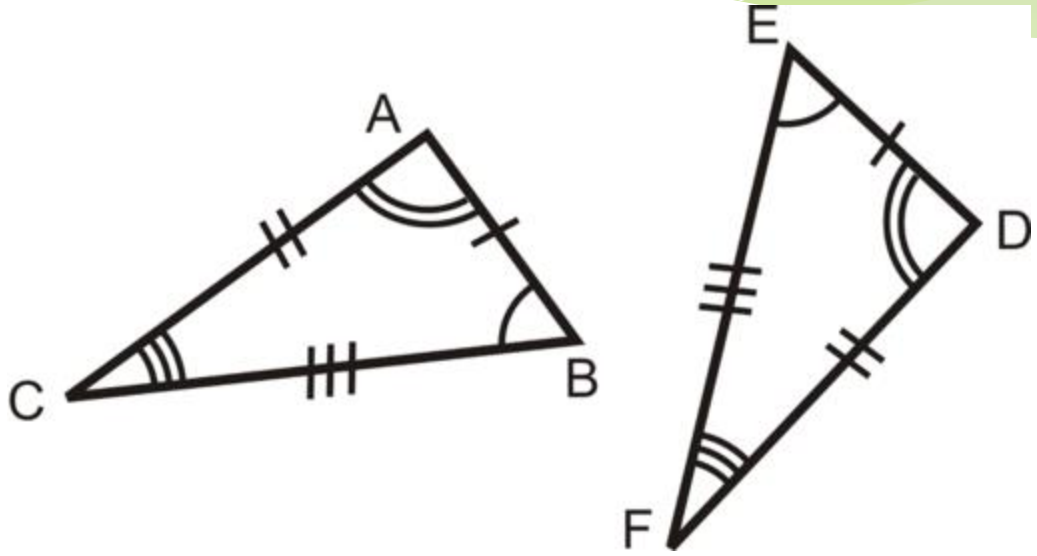
4.2
Apply Congruence and Triangles

Congruent Figures

* Have exactly the _____ and _____.
* Have congruent _____ and congruent _____

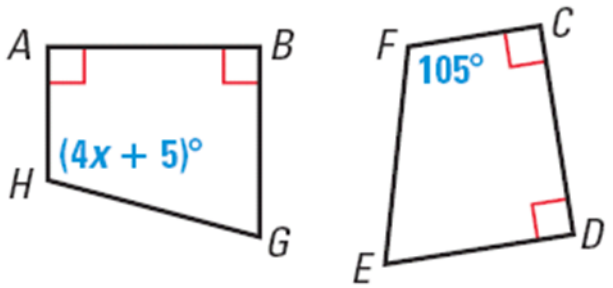


EX: Write a congruence statement for the triangles. Identify all pairs of congruent corresponding parts.



EX:

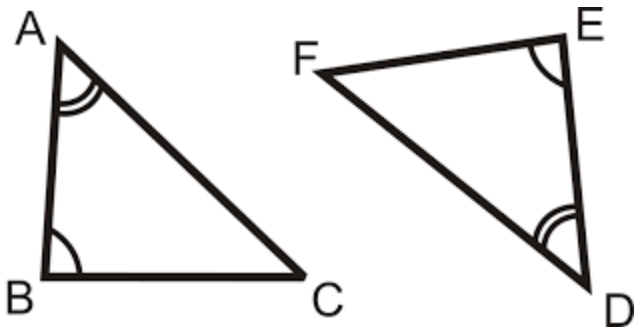
In the diagram at the right, $ABGH \cong CDEF$.



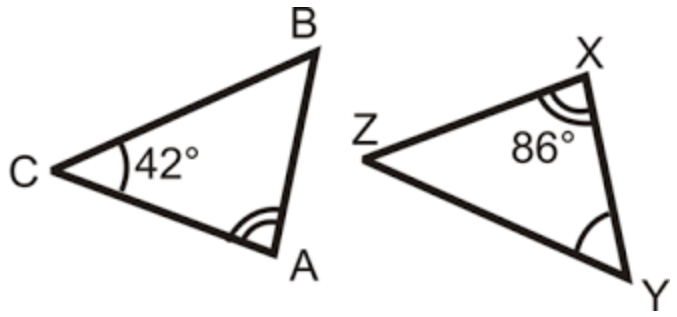
* Find the value of x and m<H.

Third Angles Theorem

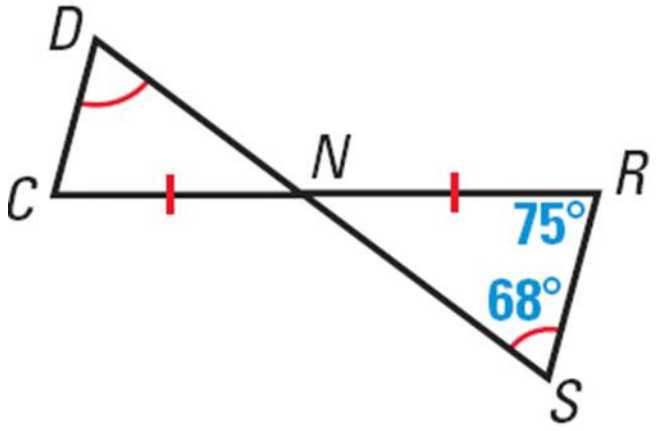
* If _____ of one triangle are _____ to _____ in another triangle, then the _____ are also _____.



EX: Find the value of <B and <Z.



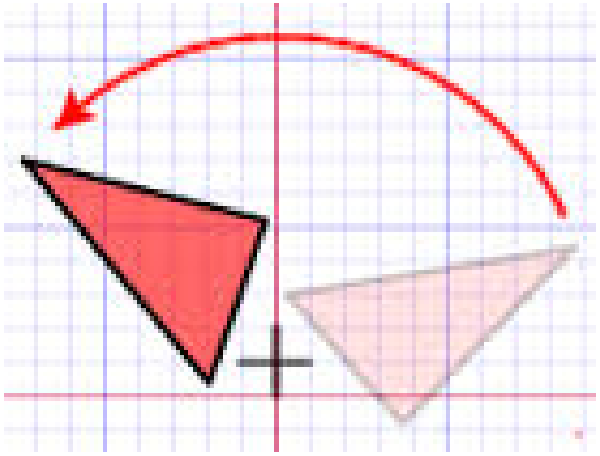
EX: What is the m<DCN?



4.3
Relate Transformations and Congruence

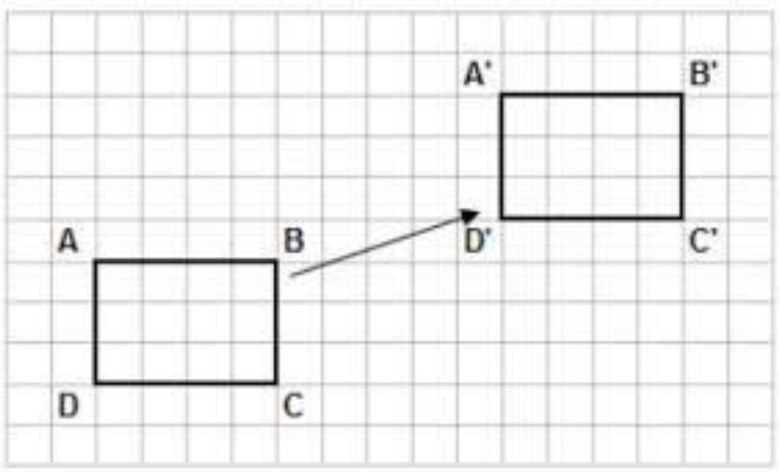
Transformations

* A _____ or _____ in a figure to produce a _____.



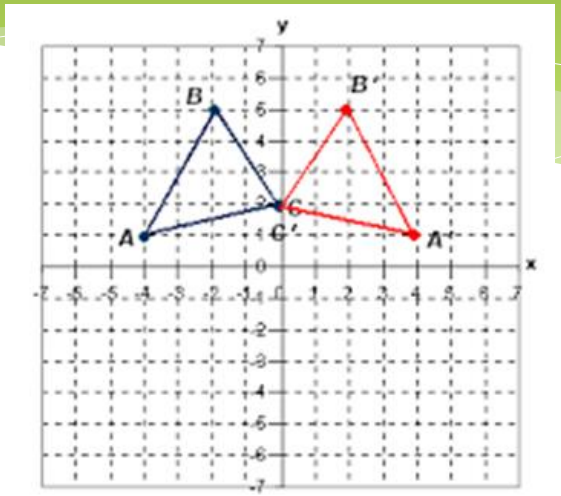
Rigid Motion

* A transformation that keeps _____, _____, and _____ the same.
* Translations:

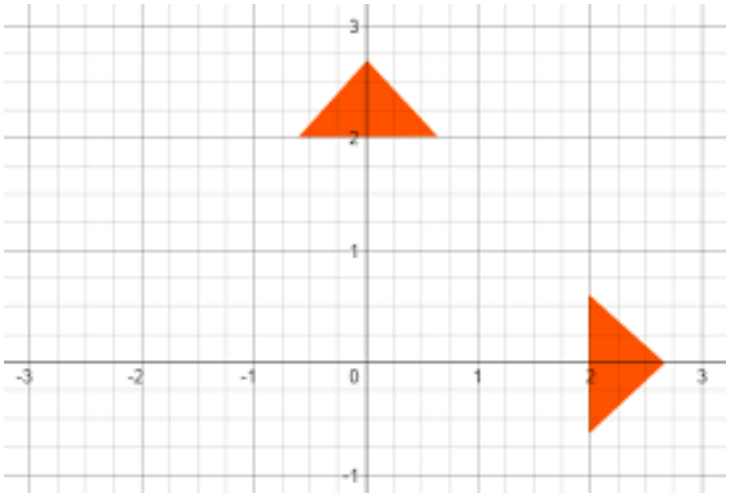


Rigid Motion Continued:

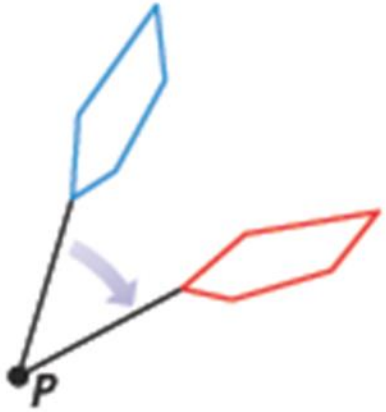
* Reflections:

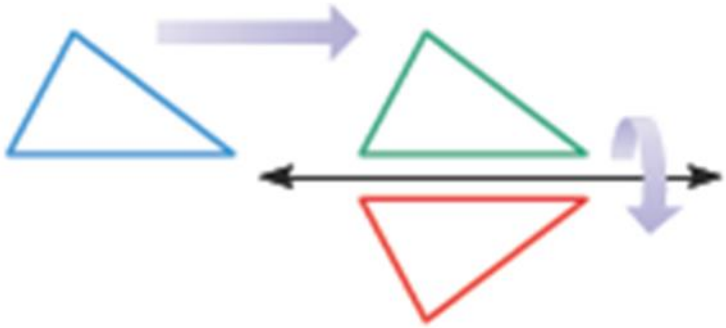


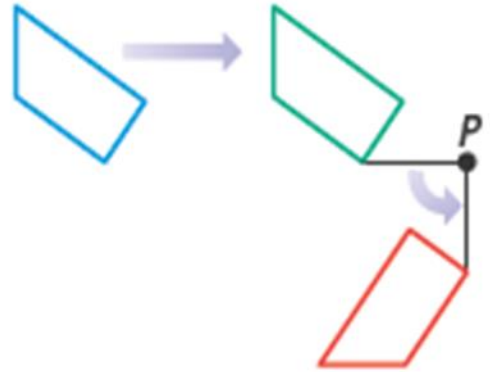
* Rotations:

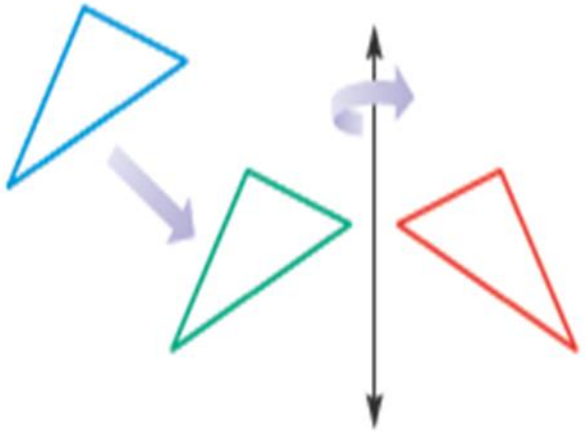


EX: Describe the transformation(s) you can use to move the blue figure onto the red figure.





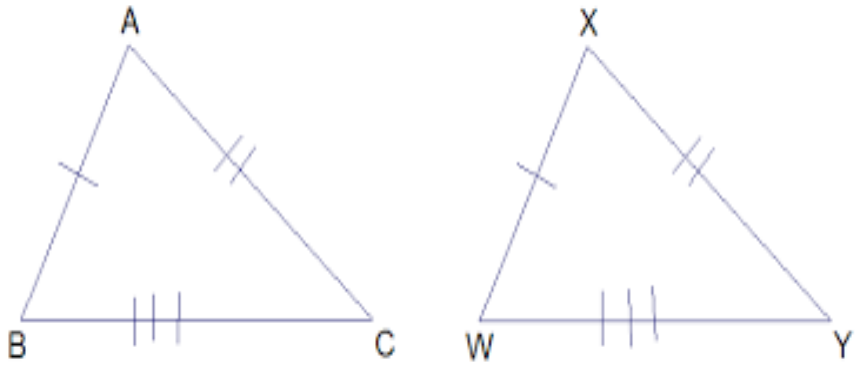

P



4.4
Prove Triangles Congruent by SSS

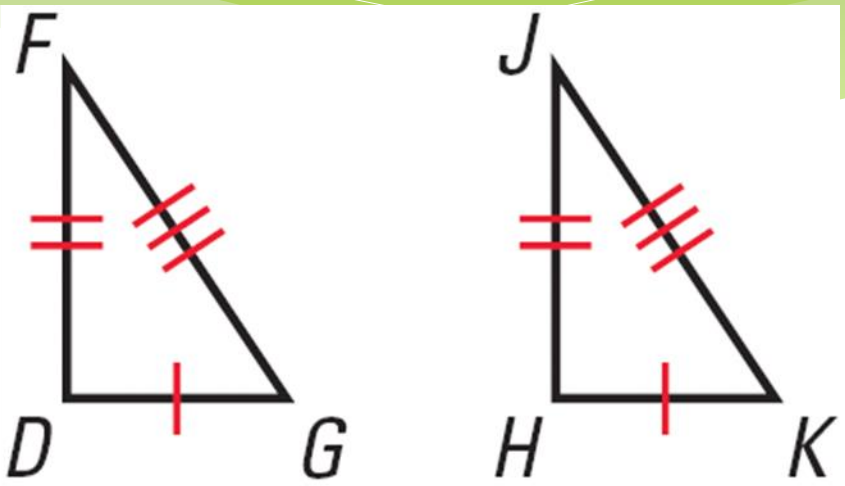
Side-Side-Side (SSS) Congruence Postulate

* If _____ of one triangle are _____ to _____ of a second triangle, the two triangles are _____.

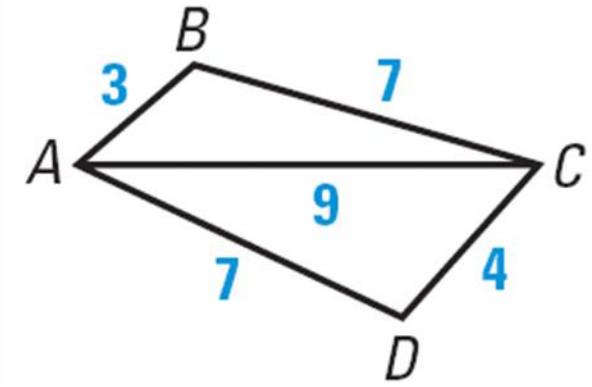


EX: Decide whether the congruence statement is true. Explain.

1. $\triangle DFG \cong \triangle HJK$



2. $\triangle ACB \cong \triangle CAD$

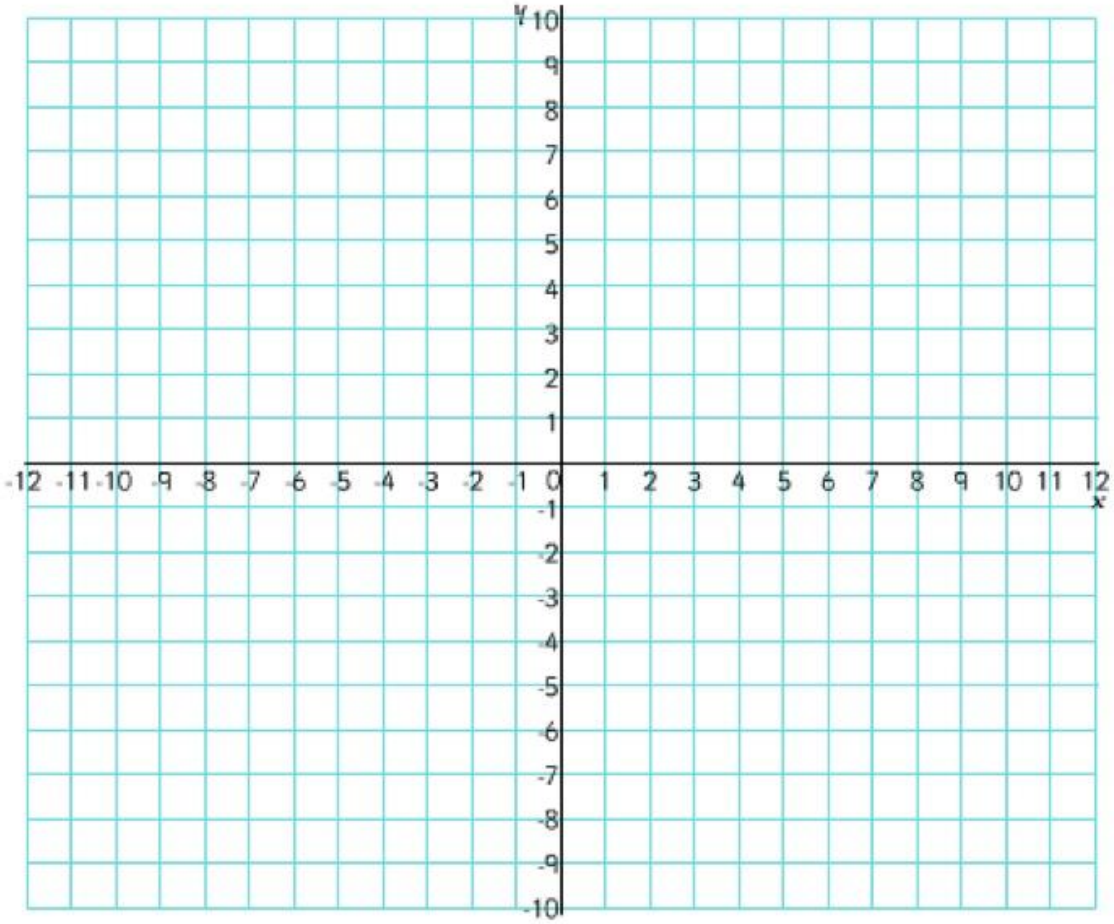


EX:

has vertices $J(-3, -2)$, $K(0, -2)$, **and** $L(-3, -8)$.

RST **has vertices** $R(10, 0)$, $S(10, -3)$, **and** $T(4, 0)$.

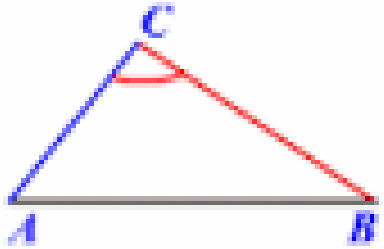
Graph the triangles in the same coordinate plane and show that they are congruent.

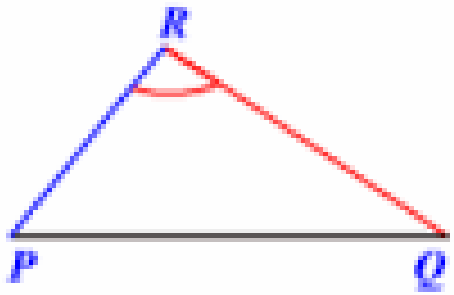

y
x
10
9
8
7
6
5
4
3
2
1
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12

4.5
Prove Triangles Congruent by SAS and HL

Side-Angle-Side (SAS) Congruence Postulate

* If _____ and the _____ of one triangle are _____ to _____ and the _____ of another triangle, then the two triangles are _____.

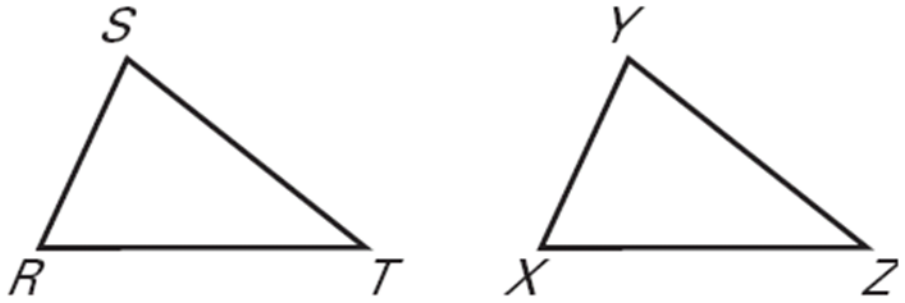




EX:

State a third congruence that would allow you to prove $\triangle RST \cong \triangle XYZ$ by the SAS Congruence postulate.

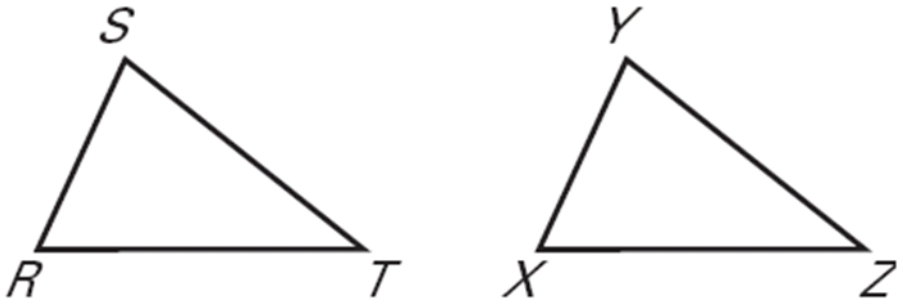
3. $\overline{ST} \cong \overline{YZ}, \overline{RS} \cong \overline{XY}$



EX:

State a third congruence that would allow you to prove $\triangle RST \cong \triangle XYZ$ by the SAS Congruence postulate.

4. $\angle T \cong \angle Z, \overline{RT} \cong \overline{XZ}$



EX: Decide whether enough information is given to prove that the triangles are congruent by SAS.

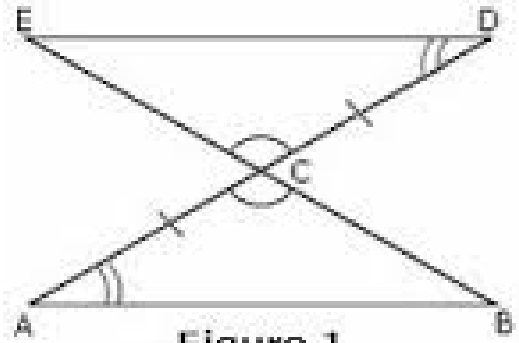


Figure 1

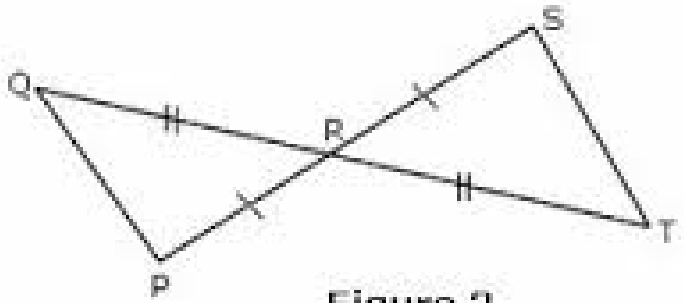
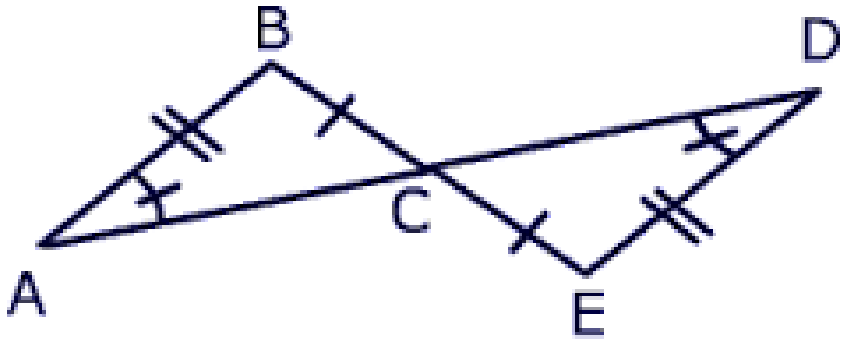
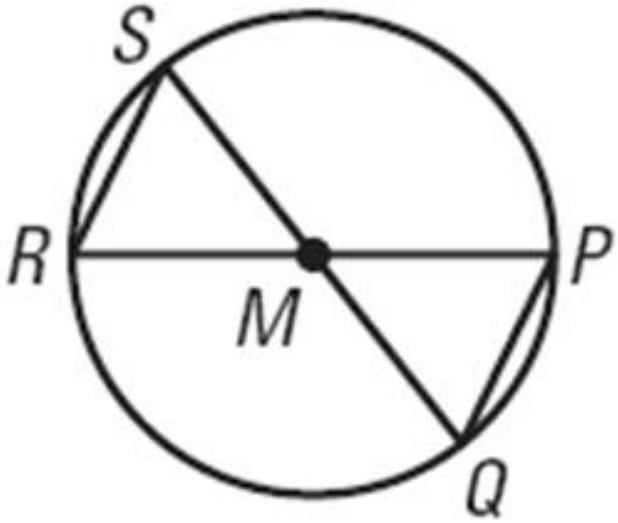


Figure 2



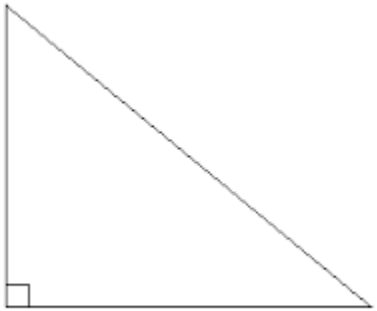
EX:

In the diagram, QS and RP pass through the center M of the circle. What can you conclude about MRS and MPQ?



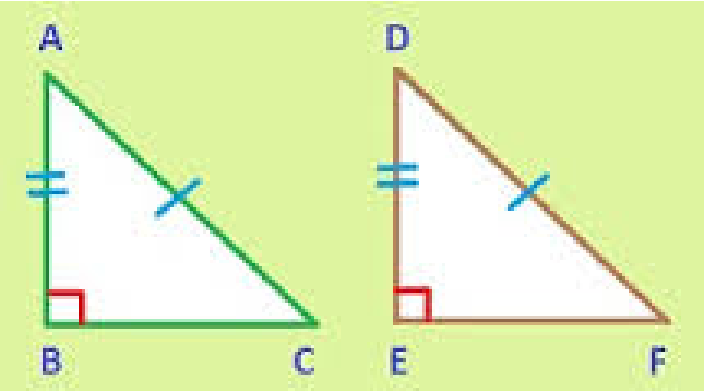
Right Triangles

* Legs – the _____ to the _____
* Hypotenuse – the side _____ of the _____



Hypotenuse-Leg Theorem

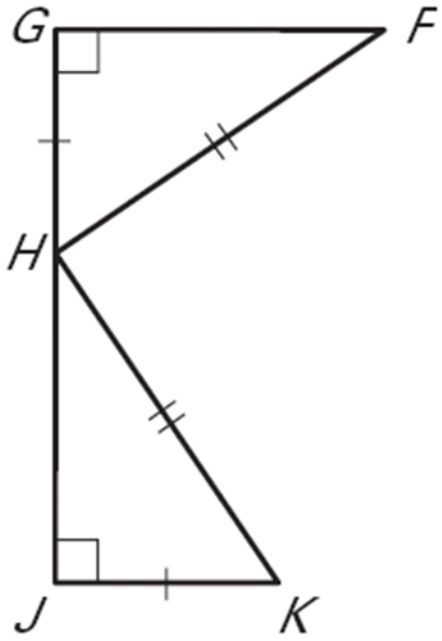
* If the _____ and a _____ of a right triangle are _____ to the _____ and _____ of another right triangle, then the two triangles are _____.



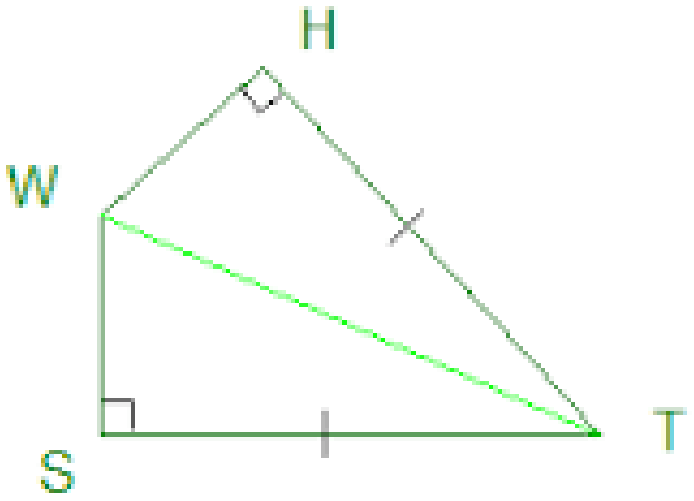
EX:

Is there enough given information to prove the triangles congruent? If there is, state the postulate or theorem.

2. $\triangle FGH, \triangle HJK$



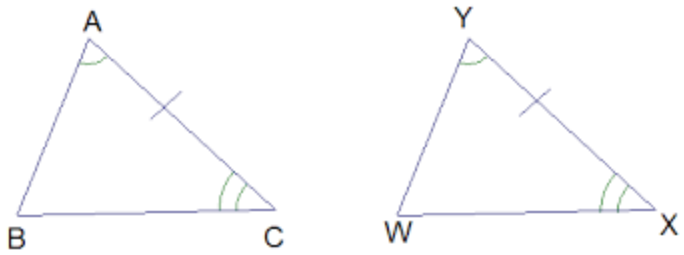
EX: Decide whether enough information is given to prove that the triangles are congruent. Is so, state the postulate or theorem used.



Prove Triangles Congruent by ASA and AAS

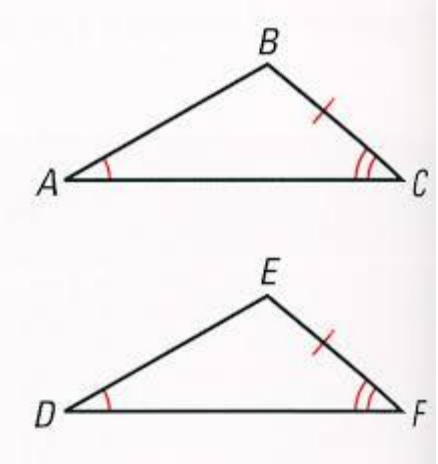
Angle-Side-Angle (ASA) Congruence Postulate

* If _____ and the _____ of one triangle are congruent to _____ and the _____ of another triangle, then the two triangles are _____.

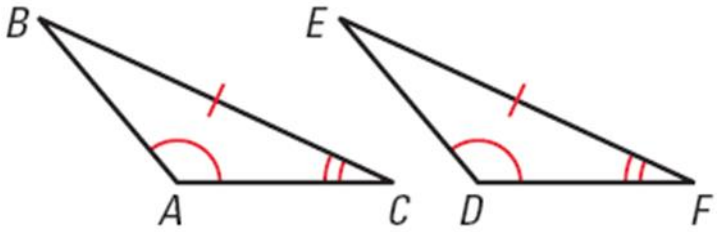


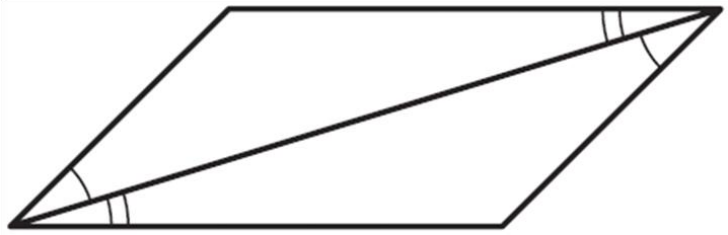
Angle-Angle-Side (AAS) Congruence Postulate

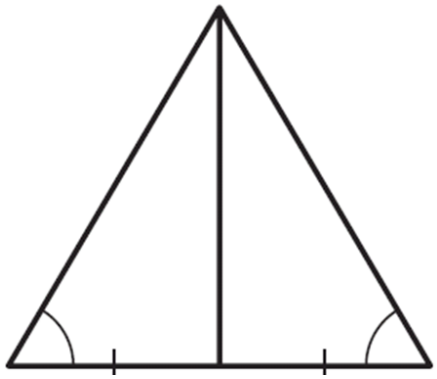
* If _____ and a _____ of one triangle are _____ to _____ _____ and a _____ of another triangle, then the two triangles are _____.



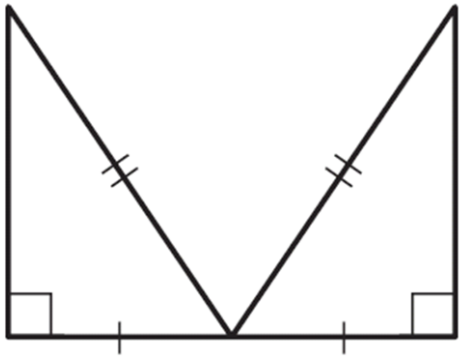
EX: Is it possible to prove that the triangles are congruent? If so, state the postulate or theorem used.



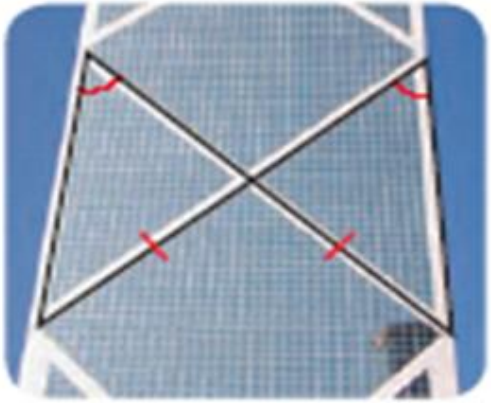




Tell whether the pair of triangles is congruent or not and why.



a.



b.

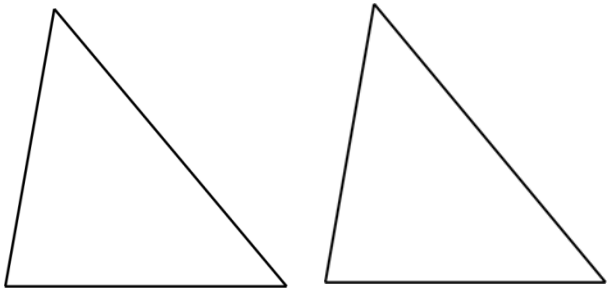
c.

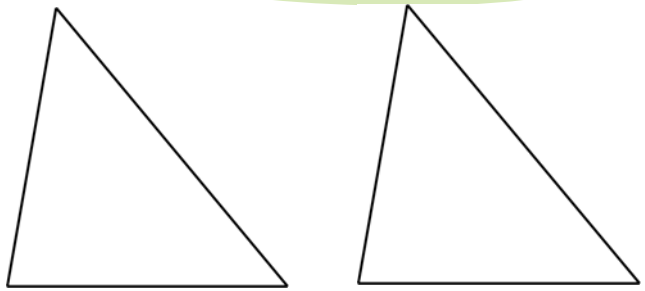
EX: Tell whether you can use the given information to determine whether

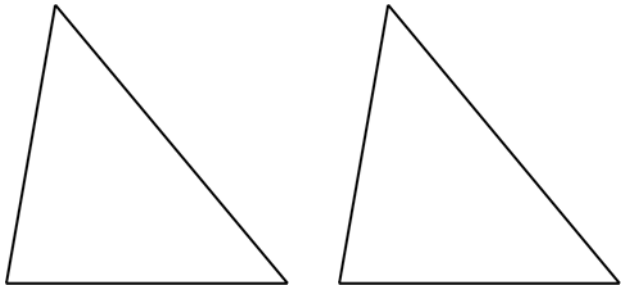
_____

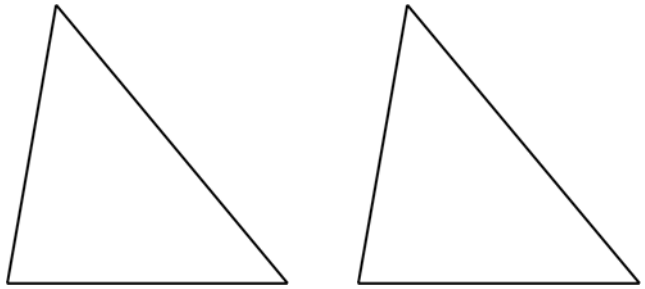
Triangle Congruence Summary

* All Triangles

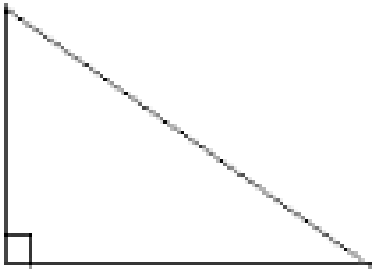


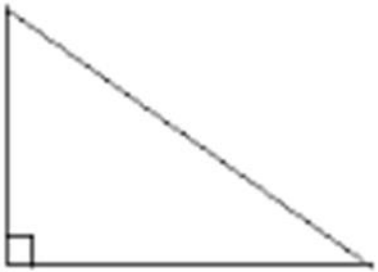






* Right Triangles

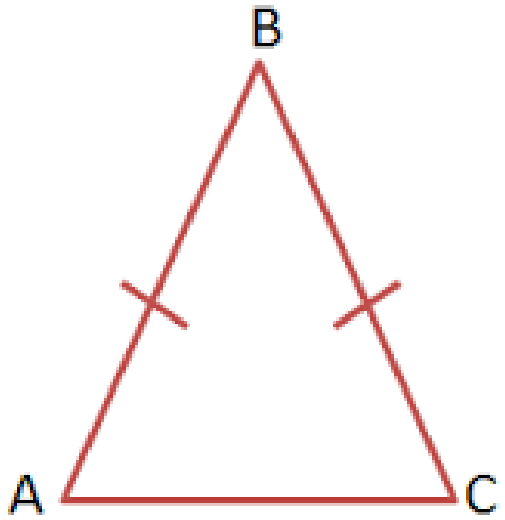




4.8
Use Isosceles and Equilateral Triangles

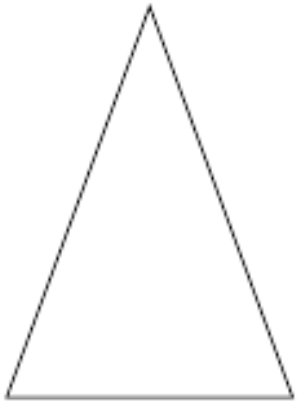
Isosceles Triangles

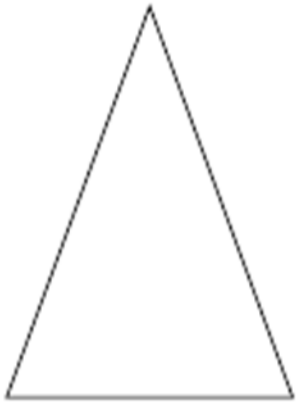
* Isosceles Triangles have _____
* Parts of Isosceles Triangles:



Base Angles Theorem

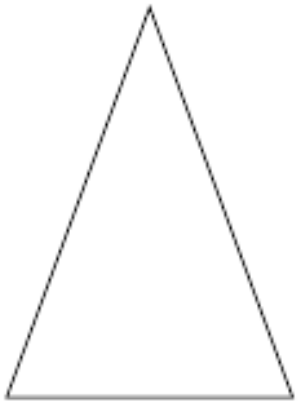
* If _____ of a triangle are congruent, then the _____ are _____.

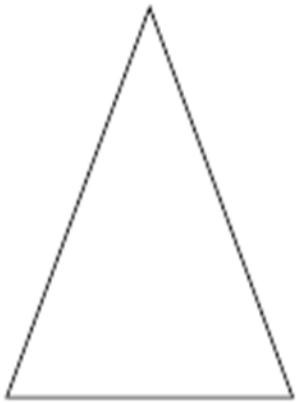




Converse to Base Angle Theorem

* If _____ in a triangle are congruent, then the _____ are _____.



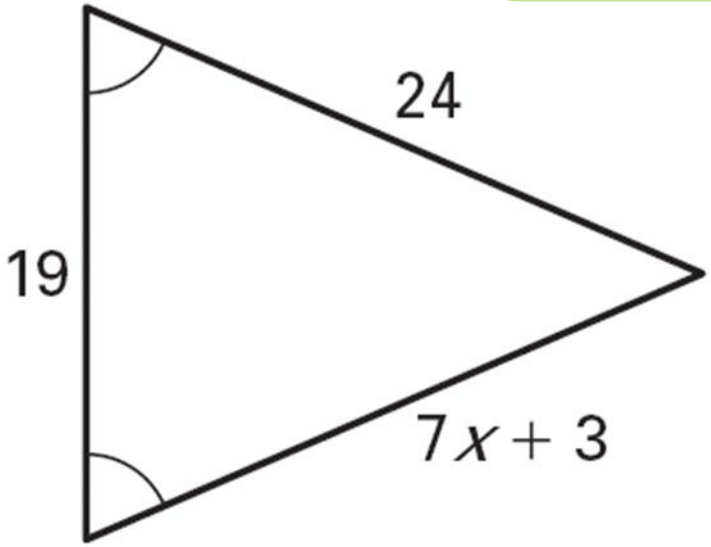


EX:

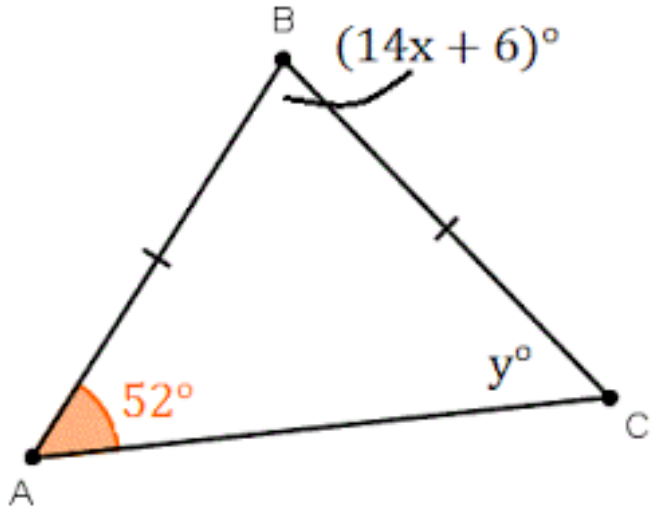
* If the measure of vertex angle of an isosceles triangle is 112°, what are the measures of the base angles?

EX: Solve for x.

2.

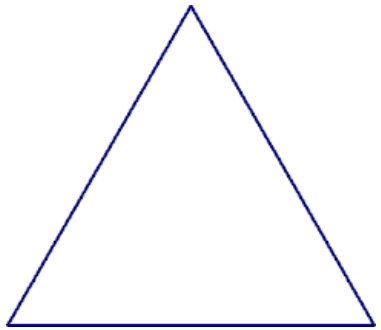


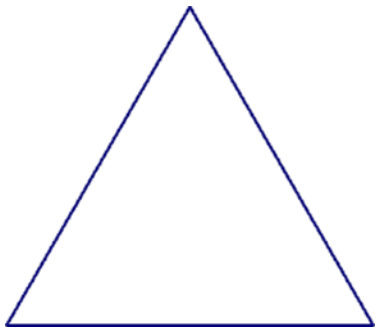
EX: Find the value of x and y.



Equilateral and Equiangular Triangles

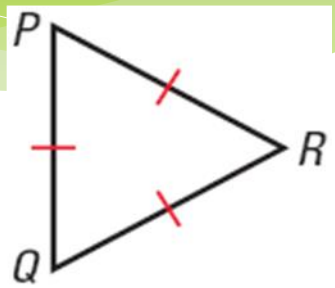
* Equilateral Triangles have _____
* Equiangular Triangles have _____
* All _____ are also _____
* All _____ are also _____
* Meaning:





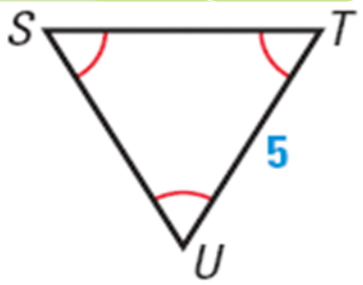
EX:

Find the measures of P, Q, and R.



EX:

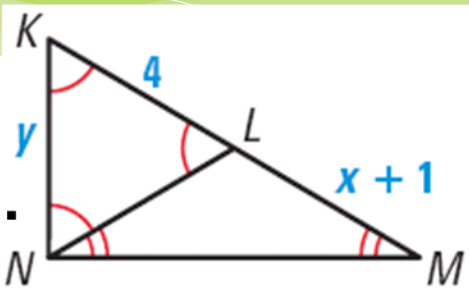
3. Find ST in the triangle at the right.



EX:

ALGEBRA

Find the values of x and y in the diagram.



EX:

4. Find the perimeter of triangle.