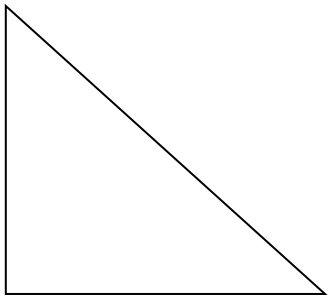
The Angles of a Triangle

Definition: A triangle is the union of three line segments that are determined by three non-collinear points.

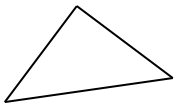
Parts of a triangle:



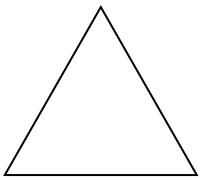
Types of triangles: **[fill in the blanks]**

Classified by Congruent sides

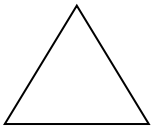
_____ No congruent sides



_____ Two congruent sides



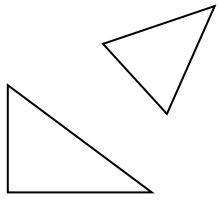
_____ Three congruent sides



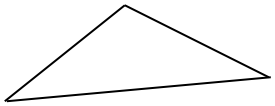
Classify by Angles:

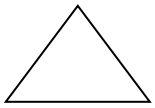
_____ all angles are acute

_____ one right angle



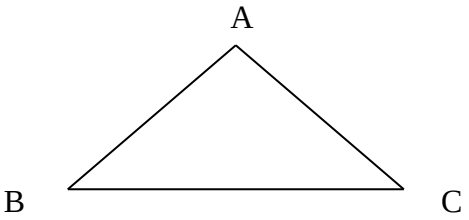
_____ one obtuse angle



_____ all angles are congruent 

Theorem 2.4.1: In a triangle, the sum measure of the interior angles is $180°$.

Given: ΔABC
Prove: $m\angle A + m\angle B + m\angle C = 180°$

Picture Proof: 

Example 1: ΔABC, has $m\angle A = m\angle C = 76°$, find $m\angle B$. What kind of triangle is ΔABC?

Corollary 2.4.2: Each angle of an equiangular triangle measures $60°$.

Corollary 2.4.3: The acute angles of a right triangle are complementary.

Example 2: Classify the triangle form the given information. We will use ΔABC.

a. $m\angle B = 115°$

b. $m\angle A = m\angle B = m\angle C$

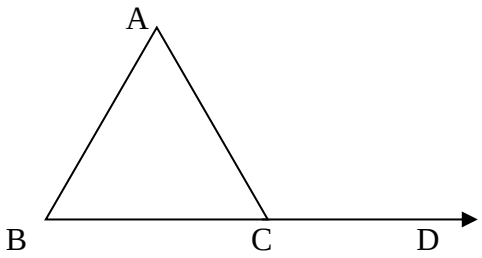
c. $m\angle A = 45°,\ m\angle B = 65°,\ m\angle C = 70°$

d. $\angle A$ and $\angle C$ are complementary.

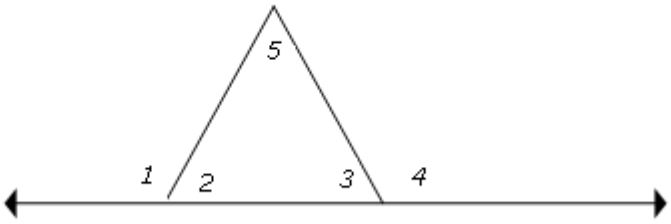
Corollary 2.4.4: If two angles of one triangle are congruent to two angles of another triangle then the third angles are also congruent.

Look over example 4, p. 91. It is a good example and we will use this corollary will be used in chapter 3.

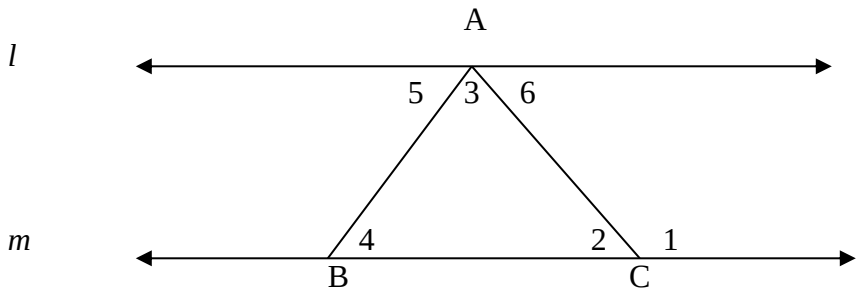
Corollary 2.4.5: The measure of an exterior angle of a triangle equals the sum of the two measures of the two non adjacent interior angles.



Example 3: Given: $m\angle 1 = 8(x + 2)$
$m\angle 3 = 5x - 3$
$m\angle 5 = 5(x + 1) - 2$
Find x and measures of angles 1, 2, 3, 4 and 5.

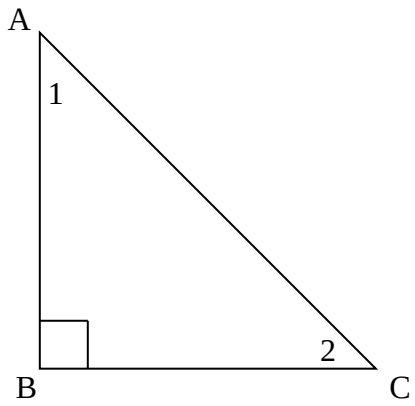


Example 4: Given ΔABC and $l \parallel m$.



Given: $m\angle 3 = 51°$, and $m\angle 2 = 76°$, find $m\angle 1$, $m\angle 4$, $m\angle 5$, and $m\angle 6$,

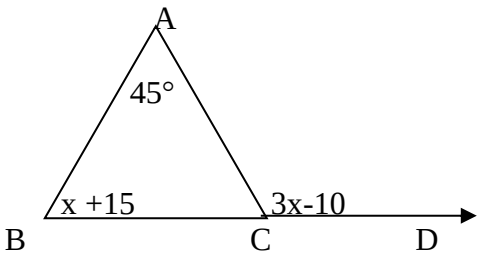
Example 5: In the figure provided, find the following:



a. Find $m\angle 1 + m\angle 2$

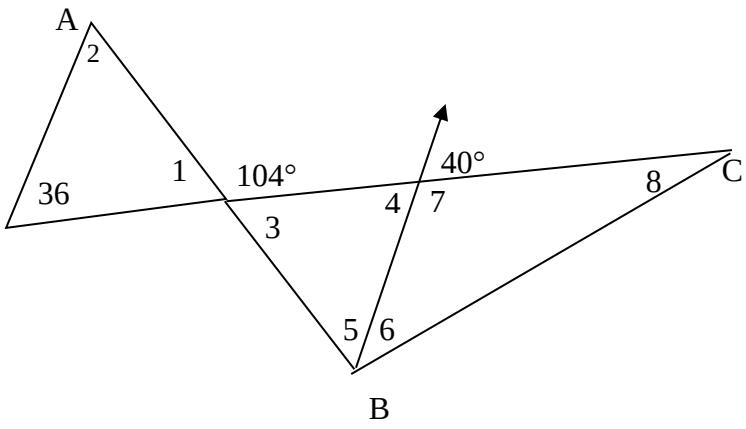
b. Find x if the $m\angle 1 = 4x + 7$ and $m\angle 2 = 2x + 3$

Example 6; Given ΔABC



Solve for x and give the measure of $\angle ABC$ and $\angle ACD$.

Example 7: If $\overline{AB}$ is perpendicular to $\overline{BC}$, find the measure of each angle in the figure below.



$m\angle 1$ =

$m\angle 2$ =

$m\angle 3$ =

$m\angle 4$ =

$m\angle 5$ =

$m\angle 6$ =

$m\angle 7$ =

$m\angle 8$ =

MORE?!?!? Try these: p. 93 #'s 16, 19, 28