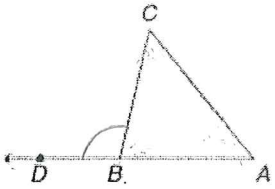
Acc Geometry Name_____

Exterior Angle Theorem and Side-Angle Inequality [4.2 & 5.2]

Exterior Angle Theorem
The measure of an exterior angle is equal to the sum of the measure of the two remote interior angles.

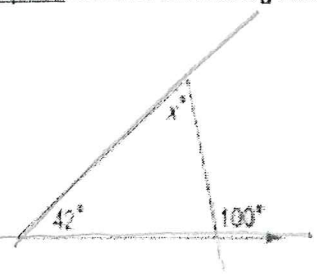
Proof:
Given: Triangle ABC
Prove: $m\angle A + m\angle C = m\angle CBD$



1. △ ABC — 1 given
2. ∠A + ∠C + ∠ABC = 180 — 2. △ sum thm
3. ∠CBD + ∠ABC = 180 — 3. linear pairs are suppl.
4. ∠A + ∠C + ∠ABC = ∠CBD + ∠ABC
   − ∠ABC − ∠ABC — 4. substitution
5. ∠A + ∠C = ∠CBD — 5. subtraction

Example 1: Solve for the missing variables in each of the following.

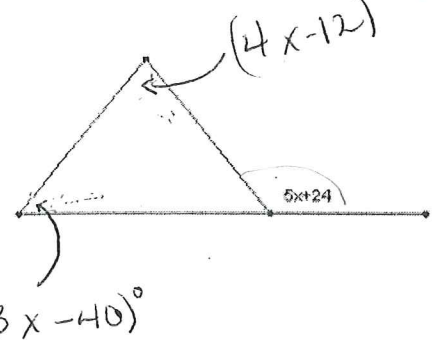
A).



$x + 42 = 100$ Ext. ∠ thm

$x = 58°$

B).



$4x - 12 + 3x - 40 = 5x + 24$ Ext ∠ thm

$\boxed{x = 38}$

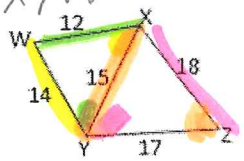
Side Angle Theorems

- In a triangle, the longest side is opposite the largest angle.
- In a triangle, the largest angle is opposite the longest side.

Example 2: Determine the relationship between the measures of the given angles.

a). $\angle WXY$ & $\angle XYW$

$\angle WXY > \angle XYW$



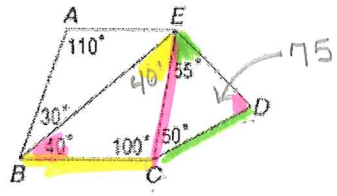
b). $\angle XZY$ & $\angle XYZ$

$\angle XYZ > \angle XZY$

Example 3: Determine the relationship between the measures of the given sides.

a). BC & EC

BC = EC



b). EC & DC

EC > CD

CD < EC