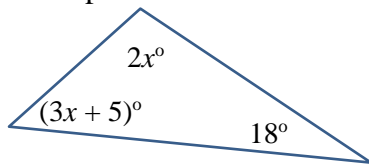## 4.1 Notes: Angles in Triangles

Triangle Sum Theorem: The sum of the angles in any triangle is _____. (You may use the name of this theorem in a proof.)

Example 1: Find x.
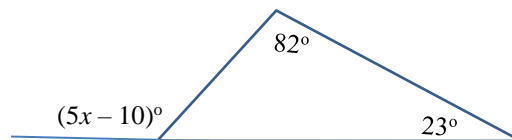
$2x^\circ$

$(3x + 5)^\circ$

18°

Exterior Angle Theorem: *Work to understand this!!!*
The measure of the exterior angle of a triangle is equal to the _____of the two remote interior angles.
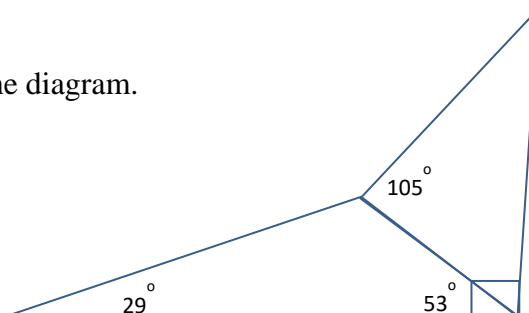(You may use the name of this theorem in a proof.)

Remote
Interior ∠

Remote Interior ∠

Exterior <

Example 2: Find x.

82°

$(5x - 10)^\circ$

23°
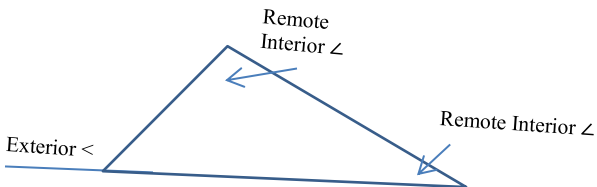
Triangle Sum Corollaries: You must write out these statements in a proof.

- The acute angles of a right triangle are _____.

- There can be at most _____ right or obtuse angle in a triangle.

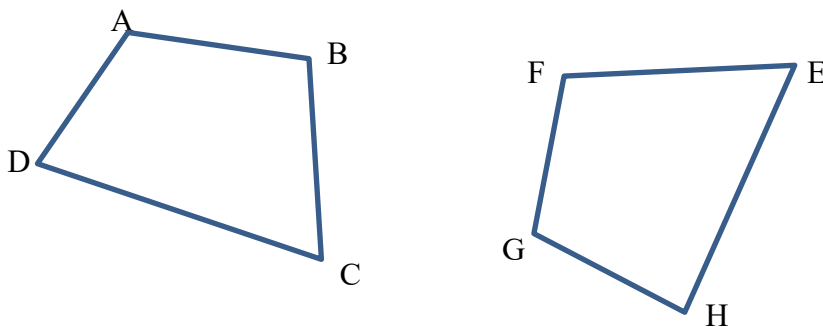Example 3: Find each missing angle in the diagram.

105°

29°

53°

4.2 Notes: Introduction to Congruent Triangles

Definition of Congruent Polygons: Two polygons are congruent *if and only if* their _____
parts are congruent.

Congruence Statement:

Example 1:   Given: ABCD ≅GFEH. List the congruent parts.

Theorem: CPCTC: Corresponding Parts of Congruent Triangles are Congruent. If two triangles are
_____, then all six pairs of corresponding parts are also _____.

(Note: when using this theorem in a proof, you may use the acronym CPCTC.)
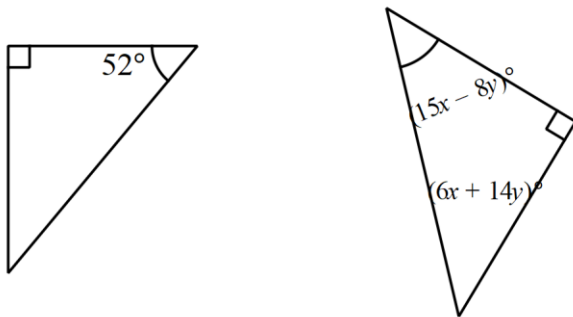
Do the 4.2 Proofs in the Proofs Packet.

Example 2: If $\triangle ABC \cong \triangle DEF$, AB = 7, BC = 9, AC = $11 + x$, DF = $3x - 13$, and DE = $2y - 5$, then find
x and y.

Third Angle Theorem: If 2 angles of one triangle are _____ to 2 angles of another Δ, then the 3rd angles of the triangles are _____. (Note: You may use the name of this theorem in a proof.)

Example 3: Find x.
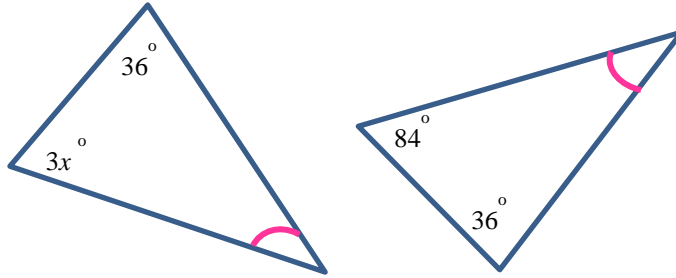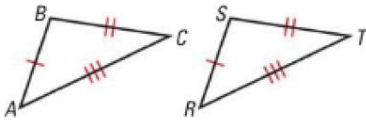

Example 4: Find $x + 3y$.

4.3: Proving Triangles Congruent by using SSS and SAS
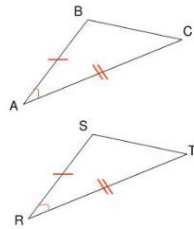
Side-side-side (SSS) Congruence
Postulate

□ If three sides of one triangle are congruent to three
sides of a second triangle, then the two triangles
are congruent.

Side-Angle-Side (SAS)
Congruence Postulate

If two sides and the included angle
of one triangle are congruent to
two sides and the included angle
of a second triangle, then the two
triangles are congruent.

If Side $\overline{AB} \cong \overline{RS}$
    Angle $\angle A \cong \angle R$
    Side $\overline{CA} \cong \overline{TR}$
Then
        $\triangle ABC \cong \triangle RST$

Examples: Are the triangles congruent? If so, by what theorem?

1)   2)

3)   4)

Now complete the 4.3 Proofs in the Proofs Packet.

4.4: Proving Triangles Congruent by using ASA and AAS

Angle-Side-Angle (ASA) Congruence

- If 2 <s and *the included side* of one Δ
  are ≈ to two <s *and the included side*
  of a 2ⁿᵈ Δ, then the Δs are ≈.

Angle-Angle-Side (AAS) Congruence

- If 2 <s and the non-included side of
  one Δ are ≈ to the *corresponding* two
  <s and side of a 2ⁿᵈ Δ, then the Δs
  are ≈.

We have 5 ways to prove congruent triangles:

1. Side Side Side (SSS)
2. Side Angle Side (SAS)
3. Angle Side Angle (ASA)
4. Angle Angle Side (AAS)
5. *One more coming next class…*

Examples: Are the triangles congruent? If so, by what theorem?

1)   2)

3)   4)

Now complete the 4.4 Proofs in the Proofs Packet.