Geometry Info Sheet #23

Proving Triangle Congruence

Postulates (for proving triangle congruence)

SSS (Side-Side-Side) Postulate: If the three sides of one triangle are congruent to the three sides of a second triangle, then the two triangles are congruent.

SAS (Side-Angle-Side) Postulate: If two sides and the included angle of one triangle are congruent to the corresponding parts of a second triangle, then the two triangles are congruent.

ASA (Angle-Side-Angle) Postulate: If two angles and the included side of one triangle are congruent to the corresponding parts of a second triangle, then the two triangles are congruent.

Theorems (for proving triangle congruence)

AAS (Angle-Angle-Side) Theorem: If two angles and a non-included side of one triangle are congruent to the corresponding parts of a second triangle, then the two triangles are congruent.

HL (Hypotenuse-Leg) Theorem: If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of another right triangle, then the two triangles are congruent.

CPCTC, which stands for **Corresponding Parts of Congruent Triangles are Congruent**, means that if and only if two triangles are congruent, then their six corresponding parts (three angles and three sides) are congruent. This follows from the Polygon Congruence Postulate, which states that two polygons are congruent if and only if their corresponding angles and sides are congruent.

Other Combinations (that **cannot** prove triangle congruence)

AAA (Angle-Angle-Angle) Combination: If the three angles of one triangle are congruent to the three angles of a second triangle, then the two triangles are similar, but they will be congruent only if at least one pair of corresponding sides is also congruent.

SSA (Side-Side-Angle) Combination: If two sides and a non-included angle of one triangle are congruent to the corresponding parts of a second triangle, then the two triangles will be congruent only if the given angle is a right angle (the Hypotenuse-Leg Theorem).