<u>Def</u> A triangle is a ___________ triangle if one of the interior angles is a right angle. The side opposite the right angle is called the _________________ and the two sides adjacent to the right angle are called the __________ .

<u>Theorem</u> (Hypotenuse-Leg Theorem) Let $\triangle ABC$ and $\triangle DEF$ be two right triangles with right angles at C and F. If $\overline{AB} \cong \overline{DE}$ and $\overline{BC} \cong \overline{EF}$, then $\triangle ABC \cong \triangle DEF$.

Sketch a diagram for this theorem. Continue to add to the picture as you prove the theorem.

<u>Proof</u> Let $\triangle ABC$ and $\triangle DEF$ be two right triangles with right angles at C and F.

Let $\overline{AB} \cong \overline{DE}$ and $\overline{BC} \cong \overline{EF}$, [Show $\triangle ABC \cong \triangle DEF$.]

Let G be a point on $\overrightarrow{AC}$ such that $\overline{CG} \cong \overline{FD}$ (Point Construction Postulate).

Then $\angle BCG$ forms a ________________ with $\angle BCA$.

Thus by the Linear Pair Theorem, $\mu(\angle BCG) =$ __________.

So $\triangle BCG \cong \triangle EFD$ by ___________ .

Since these two triangles are congruent, __________ $\cong \overline{DE}$.

Therefore $\overline{GB} \cong$ __________ from the given statements.

Hence $\triangle ABG$ is an ______________ triangle.

Thus ______________________ by the Isosceles Triangle Theorem.

Therefore $\triangle ABC \cong \triangle DEF$. by ___________ . ■

Go back to the given statements. What type of triangle congruence is this theorem? (e.g. SAS, ASA, etc.)

So in the special case of ___________ triangles, ___________ congruency holds.

See the board for diagrams of SSA possibilities and sketch them below.

From the picture, fill in the blanks to the theorem. [Hint for the second blank: Look at the diagram with both options for the placement of point B, call them B and B'. What type of triangle is $\triangle BCB'$?]

<u>Theorem</u> (Side-Side-Angle (SSA)): If $\triangle ABC$ and $\triangle DEF$ are triangles such that $\angle BAC \cong \angle EDF, \overline{AC} \cong \overline{DF}$, and $\overline{BC} \cong \overline{EF}$, then $\triangle ABC$________$\triangle DEF$ or $\angle ABC$ and $\angle DEF$ are ____________________ .

<u>Proof</u> Let $\triangle ABC$ and $\triangle DEF$ be triangles such that $\angle BAC \cong \angle EDF, \overline{AC} \cong \overline{DF}$, and $\overline{BC} \cong \overline{EF}$.

By the Point-Construction Postulate, choose a point G on $\overrightarrow{AB}$ such that $AG = DE$.

Case 1: $G = B$. [Finish this case.]

Case 2: $G \neq B$. Then $A * G * B$ or $A * B * G$. WLOG assume $A * G * B$ otherwise we could restart the proof interchanging $\triangle ABC$ and $\triangle DEF$. [Finish the proof.]

So far, we've been sketching our pictures by making the known angle acute. Do you get the same possible triangles if the known angle is obtuse?