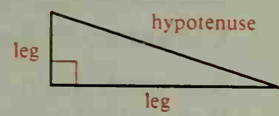
Our final method of proving triangles congruent applies only to right triangles. In a right triangle the side opposite the right angle is called the **hypotenuse** (hyp.). The other two sides are called **legs.**



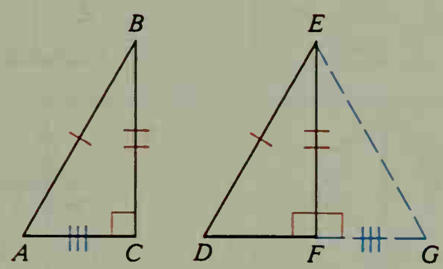
A proof in two-column form for the next theorem would be too long and involved. The proof shown below is written instead in *paragraph form*, which emphasizes the *key steps* in the proof. You will learn to write paragraph proofs in the next section.

Theorem 4-4 *HL Theorem*

If the hypotenuse and a leg of one right triangle are congruent to the corresponding parts of another right triangle, then the triangles are congruent.

Given: $\triangle ABC$ and $\triangle DEF$;
$\angle C$ and $\angle F$ are right $\angle$s;
$\overline{AB} \cong \overline{DE}$ (hypotenuses);
$\overline{BC} \cong \overline{EF}$ (legs)

Prove: $\triangle ABC \cong \triangle DEF$



Proof:

By the Ruler Postulate there is a point G on the ray opposite to $\overrightarrow{FD}$ such that $\overline{FG} \cong \overline{CA}$. Draw $\overline{GE}$. Because $\angle DFE$ is a right angle, $\angle GFE$ is also a right angle. $\triangle ABC \cong \triangle GEF$ by the SAS Postulate. Then $\overline{AB} \cong \overline{GE}$. Since $\overline{DE} \cong \overline{AB}$, we have $\overline{DE} \cong \overline{GE}$. In isosceles $\triangle DEG$, $\angle G \cong \angle D$. Since $\triangle ABC \cong \triangle GEF$, $\angle A \cong \angle G$. Then $\angle A \cong \angle D$. Finally, $\triangle ABC \cong \triangle DEF$ by the AAS Theorem.

Recall from Exercise 22 on page 121 and Exercise 11 on page 124 that AAA and SSA correspondences do not guarantee congruent triangles. We can now summarize the methods available for proving triangles congruent.

Summary of Ways to Prove Two Triangles Congruent

All triangles:	SSS	SAS	ASA	AAS
Right triangles:	HL			

Which of these methods are postulates and which are theorems?