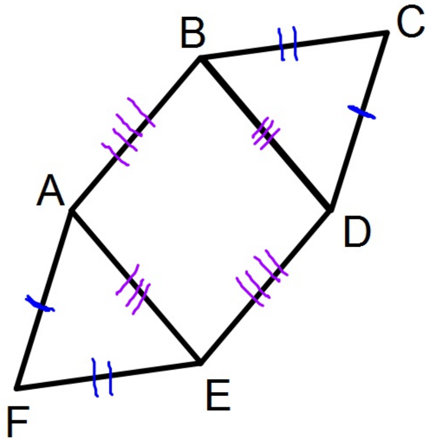
Bellwork

1. **Given:** $\overline{AF} \cong \overline{DC}$
$\overline{FE} \cong \overline{CB}$
ABDE is a rectangle



Prove: $\Delta AEF \cong \Delta DBC$

Statements	Reasons
① $\overline{AF} \cong \overline{DC}$, $\overline{FE} \cong \overline{CB}$ ABDE is a rectangle. (S) (S)	① Given
② $\overline{AE} \cong \overline{BD}$ (S) $\overline{AB} \cong \overline{DE}$	② Def of Rect.
③ $\Delta AEF \cong \Delta DBC$	③ SSS.

Proving Triangle Congruence

Throughout this unit we will be focusing on several methods of proving two triangles are congruent including:

1. Side-Side-Side (SSS)
2. Side-Angle Side (SAS)
   [This is a main focus of this lesson]
3. Hypotenuse Leg (HL)
   [This is a main focus of this lesson]
4. Angle-Side-Angle (ASA)
5. Angle-Angle-Side (AAS)

Side-Angle-Side

Side-Angle-Side (SAS) Congruence Postulate:

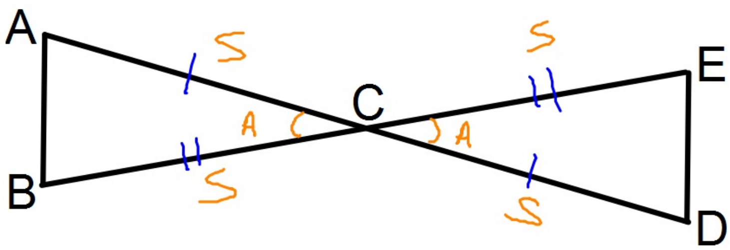
IF two sides and the included angle of one triangle are congruent to two sides and the included angle of a second triangle,

THEN the two triangles are congruent.

Side-Angle-Side Example

Given: C is the midpoint of AD and BE.

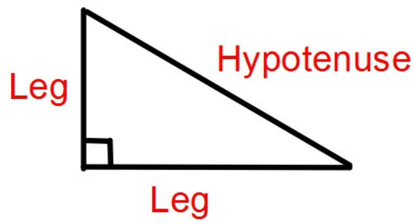
Prove: $\Delta ACB \cong \Delta DCE$



Statements	Reasons
① C is the midpt of $\overline{AD}$ + $\overline{BE}$	① Given
② $\overline{AC} \cong \overline{CD}$ $\overline{BC} \cong \overline{CE}$	② Def of Midpt.
③ $\angle ACB \cong \angle DCE$	③ Vertical Angles.
④ $\Delta ACB \cong \angle DCE$	④ SAS.

Important Vocabulary

Right Triangles: In a right triangle, the sides adjacent to the right angle are called the **legs**. The side opposite the right angle is called the **hypotenuse** of the right triangle.



Perpendicular: Two lines that intersect to form a right angle.
(Denoted as $\perp$)

Hypotenuse-Leg

Hypotenuse-Leg (HL) Congruence Theorem:

IF the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second right triangle,

THEN the two triangles are congruent.

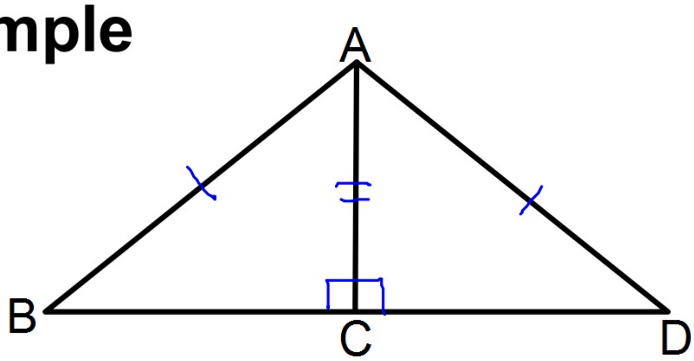
Important Note: You must show that a triangle is a right triangle in order to use HL.

Example

Given: $\overline{AB} \cong \overline{AD}$

$\overline{AC} \perp \overline{BD}$

Prove: $\Delta ABC \cong \Delta ADC$



Statements	Reasons
① $\overline{AB} \cong \overline{AD}$, $\overline{AC} \perp \overline{BD}$	① Given
② $\angle ACB$ + $\angle ACD$ are Rt $\angle$'s.	② Def $\perp$
③ ΔACB + ΔACD are Rt Δ's	③ Def Rt Δ.
④ $\overline{AC} \cong \overline{AC}$	④ Reflexive Prop.
⑤ $\Delta ABC \cong \Delta ADC$	⑤ HL