At this point, we have learned only 4 reasons for congruent triangles. They are **SSS**, **SAS**, **ASA**, and **AAS**.

Flow proofs are an easy way to organize a proof involving congruent triangles.

**Example:**
Given: \( \angle W \cong \angle Z \)
\( WX \cong OZ \)

Prove: \( \triangle WXY \cong \triangle ZQY \)

![Diagram of triangles WXY and ZQY with given congruences and angles]

**Fill-in-the-Box #1**

1) Given: \( \overline{AB} \cong \overline{BC} \)
\( \overline{AD} \cong \overline{DC} \)

Prove: \( \triangle ABD \cong \triangle CBD \)

![Diagram of triangles ABD and CBD with given congruences and angles]
2) Given: \( \overline{XZ} \cong \overline{ZQ} \)
\( \overline{ZR} \cong \overline{YZ} \)

Prove: \( \triangle XYZ \cong \triangle QRZ \)

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Once you determine that two triangles are congruent, you can state that all of the corresponding parts of the two triangles are congruent.

Definition of Congruent Triangles (aka CPCTC)

\( \text{CPCTC} = \text{Corresponding Parts of Congruent Triangles are Congruent} \)

CPCTC is the only box that is used after a congruent triangle box.

We can also use some boxes at the beginning of a proof to show that segments or angles are congruent.

**Example:**

Given: \( \angle W \cong \angle Z \)

\( Y \) is midpt of \( \overline{WZ} \)

Prove: \( \overline{XW} \cong \overline{QZ} \)
Fill-in-the-Box #2

1) Given: \( \overline{AC} \) bisects \( \angle BAD \)
   \( AB \cong AD \)
Prove: \( \angle B \cong \angle D \)

   \[ \begin{align*}
   \overline{AB} & \cong \overline{AD} \\
   \overline{AC} & \cong \overline{AC} \\
   \angle 1 & \cong \angle 2 \\
   \Delta ABC & \cong \Delta ADC \\
   \angle B & \cong \angle D
   \end{align*} \]

   Def. \angle \text{ bisector}
   \text{SAS}
   \text{Def. } \cong \Delta \text{ (CPCTC)}

2) Given: \( AB \cong BC \)
   \( BD \) bisects \( AC \)
Prove: \( \angle A \cong \angle C \)

   \[ \begin{align*}
   \overline{BD} & \cong \overline{AC} \\
   \overline{AD} & \cong \overline{DC} \\
   \overline{AB} & \cong \overline{BC} \\
   \overline{BD} & \cong \overline{BD} \\
   \Delta ABD & \cong \Delta CBD \\
   \angle A & \cong \angle C
   \end{align*} \]

   Def. \ angle \text{ bisector}
   \text{Given}
   \text{Reflexive Property}
   \text{SSS}
   \text{Def. } \cong \Delta \text{ (CPCTC)}
And don’t forget about parallel lines…

**Fill-a-Box #3**

Given: \( AB \parallel XZ \)
\( CD \cong WY \)
\( DB \cong XY \)

Prove: \( XW \parallel CB \)

Given: \( AD \parallel BC \)
\( AD \cong BC \)

Prove: \( E \) is the midpoint of \( DB \)