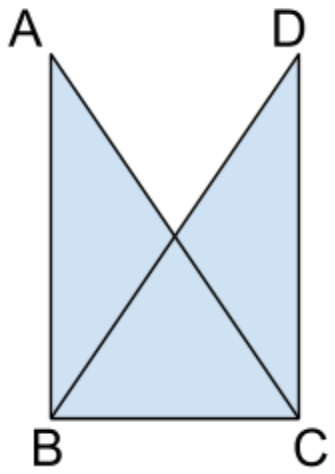
Notes: Section 4.7 Overlapping triangles and Proof practice

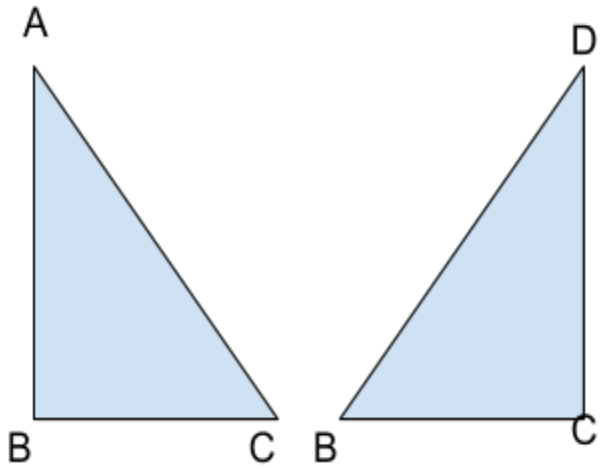
- What seems like a weird polygon at first glance can easily be simplified when you pull apart the overlapping pieces into separate triangles.

  Given: $\overline{AB} \cong \overline{DC}$ *and* $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$

  Prove: $\Delta ABC \cong \Delta DCB$



Step 1: separate the polygon into two triangles and identify the common part.



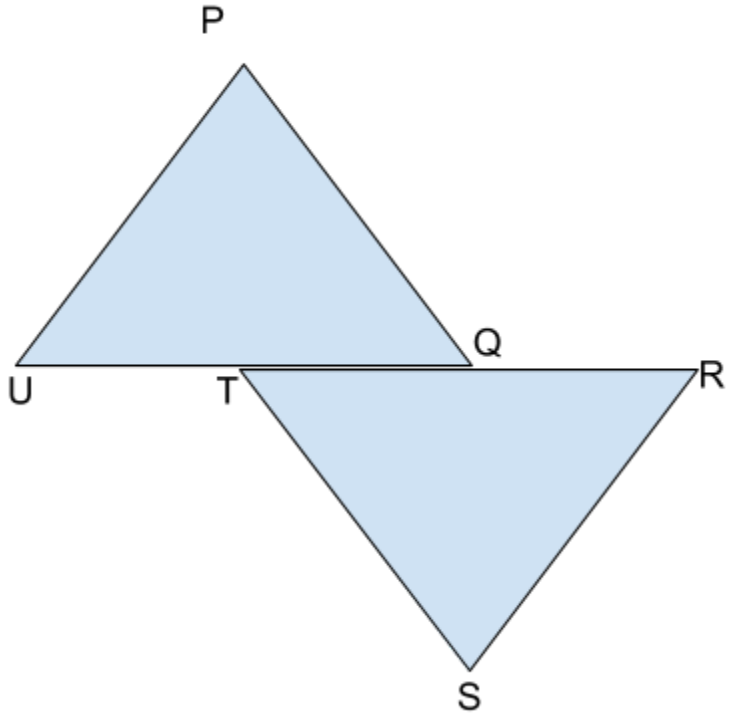
What's the common part?

Step 2: solve the proof

Prove: $\Delta ABC \cong \Delta DCB$

1. $\overline{AB} \cong \overline{DC}$ (side)	1. Given
2. $\overline{AB} \perp \overline{BC},\ \overline{DC} \perp \overline{BC}$	2. Given
3. $< ABC \cong < DCB$ (angle)	3. $\perp \rightarrow right\ angles \rightarrow \cong$
4. $\overline{BC} \cong \overline{CB}$ (side)	4. Reflexive Prop
5. $\Delta ABC \cong \Delta DCB$	5. SAS

What's the common part in this picture? TQ

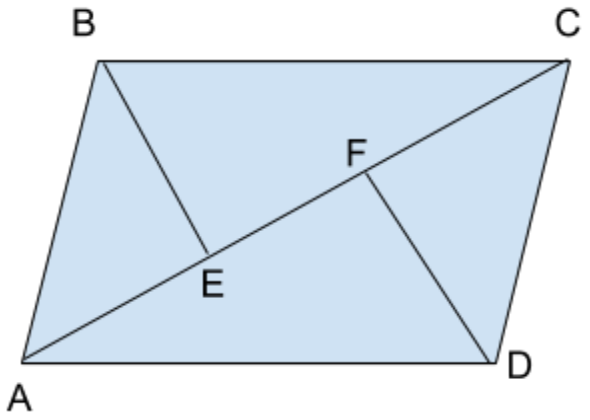


Given: $\angle PQU \cong \angle RTS$ and $\angle SRT \cong \angle PUQ$ and $\overline{TU} \cong \overline{QR}$

Prove: $\overline{RS} \cong \overline{PU}$

1. $\angle PQU \cong \angle RTS$ $\angle SRT \cong \angle PUQ$ (2 sets of angles) $\overline{TU} \cong \overline{QR}$	1. Given
2. TU = QR	2. $\cong \leftrightarrow =$
3. TU + TQ = TQ + QR	3. Add Prop of =
4. UQ = TU + TQ RT = TQ + QR	4. Segment Add Post
5. $\overline{UQ} \cong \overline{RT}$ (side)	5. $= \leftrightarrow \cong$
6. $\Delta PUQ \cong \Delta SRT$	6. ASA
7. $\overline{RS} \cong \overline{PU}$	7. CPCTC

What's the common part in this picture? EF



Prove: $\overline{AB} \cong \overline{CD}$

1. $\overline{BE} \perp \overline{AC}$; $\overline{DF} \perp \overline{AC}$ $\overline{BE} \cong \overline{DF}$; (side) $\overline{AF} \cong \overline{CE}$	1. Given

2. $< AEB \cong < CFD$ (angle)	2. $\perp \rightarrow right\ angles \rightarrow \cong$
3. AF = AE + EF CE = CF + EF	3. Segment Addition Postulate
4. AE + EF = CF + EF	4. Substitution
5. AE = CF	5. Subtraction Prop of =
6. $\overline{AE} \cong \overline{CF}$ (side)	6. $= \rightarrow \cong$
7. $\Delta AEB \cong \Delta CFD$	7. SAS
8. $\overline{AB} \cong \overline{CD}$	8. CPCTC