

Geometry (H)
Overlapping Triangles

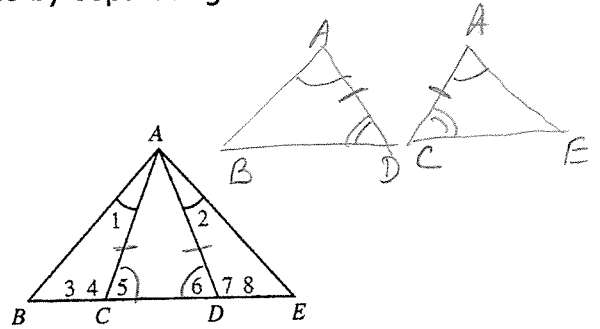
We have been practicing proving triangles are congruent. We are going to continue practicing but we are going to be looking at diagrams that are a little different than the ones we have been working with.

With each proof – it may be helpful to redraw the triangles by separating them or highlighting them in some way.

Let's try some examples!

Ex 1: Given: $\overline{AC} \cong \overline{AD}$
 $\angle 1 \cong \angle 2$

Prove: $\triangle ADB \cong \triangle ACE$

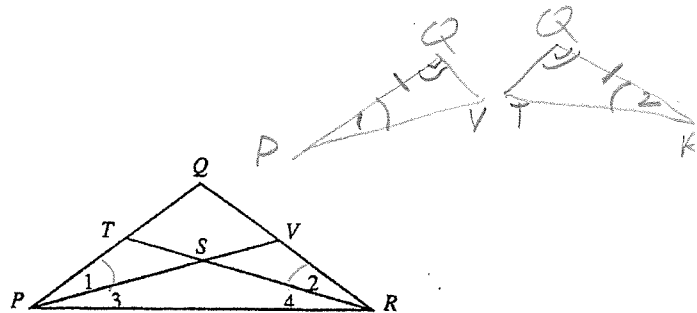


① $\angle 1 \cong \angle 2 \rightarrow$ ② $\angle BAD \cong \angle CAE$
③ $\overline{AC} \cong \overline{AD}$
④ $\angle 5 \cong \angle 6$ } \rightarrow ⑤ $\triangle ADB \cong \triangle ACE$

- ① Given
- ② Common angle then
- ③ Given
- ④ If 2 sides \cong , then \angle s opp \cong .
- ⑤ ASA \cong ASA

Ex 2: Given: $\angle 1 \cong \angle 2$
 $\overline{PQ} \cong \overline{RQ}$

Prove: $\overline{QT} \cong \overline{QV}$

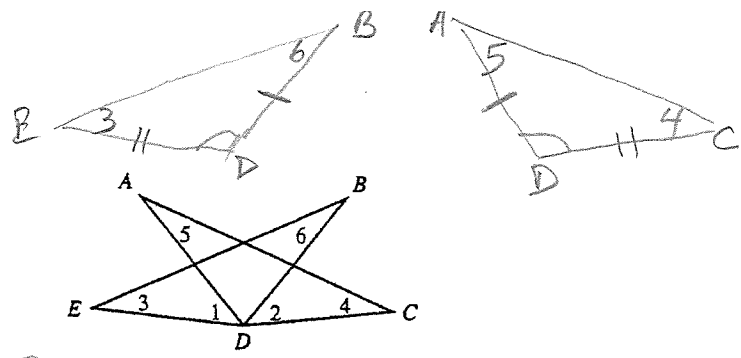


① $\angle 1 \cong \angle 2$
② $\overline{PQ} \cong \overline{RQ}$
③ $\angle Q \cong \angle Q$ } \rightarrow ④ $\triangle PQV \cong \triangle RQT \rightarrow$ ⑤ $\overline{QT} \cong \overline{QV}$

- ① Given
- ② Given
- ③ Reflexive Prop.
- ④ ASA \cong ASA
- ⑤ CPCTC

Ex 3: Given: $\angle 1 \cong \angle 2$
 $\overline{AD} \cong \overline{BD}$
 $\overline{ED} \cong \overline{CD}$

Prove: $\angle 5 \cong \angle 6$

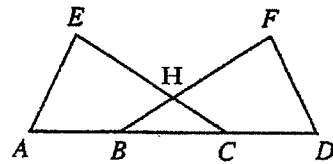


① $\angle 1 \cong \angle 2 \rightarrow$ ② $\angle EDB \cong \angle CDA$
 ③ $\overline{AD} \cong \overline{BD}$
 $\overline{ED} \cong \overline{CD}$ } \rightarrow ④ $\triangle EDB \cong \triangle CDA \rightarrow$ ⑤ $\angle 5 \cong \angle 6$

- ① Given
- ② Common Angle Thm
- ③ Given
- ④ SAS \cong SAS
- ⑤ CPCTC

Ex 4: Given: $\overline{AE} \cong \overline{DF}$
 $\angle E \cong \angle F$
 $\triangle BCH$ is isosceles

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



① $\triangle BCH$ isosceles \rightarrow ② $\overline{BH} \cong \overline{HC} \rightarrow$ ③ $\angle 1 \cong \angle 2$
 ④ $\angle E \cong \angle F$
 ⑤ $\overline{AE} \cong \overline{DF}$ } \rightarrow ⑥ $\triangle AEC \cong \triangle DFB$

⑦ $\overline{AC} \cong \overline{BD} \rightarrow$ ⑧ $\overline{AB} \cong \overline{CD}$

Same as Ex 6 on 4.5 notes