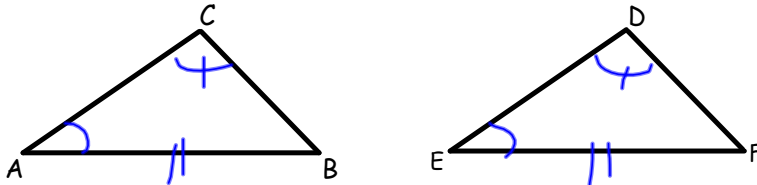


Geometry

Notes 9-5 Parallel Lines

Proving Triangles Congruent by Angle, Angle, Side

Theorem 9.12- If two angles and the side opposite one of them in one triangle are congruent to the corresponding angles and side in another triangle, then the triangles are congruent. (AAS)



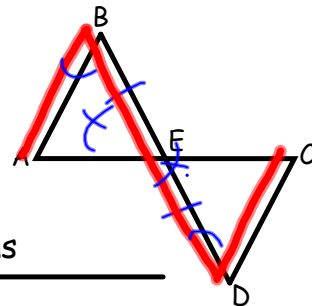
***Two triangles cannot be proved congruent by:

AAA, SSA
 ↪ Similar Δ's

Ex 1 Given: E is the midpoint of \overline{BD}

$$\overline{AB} \parallel \overline{CD}$$

Prove: $\triangle ABE \cong \triangle CDE$

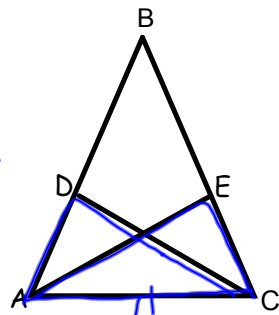
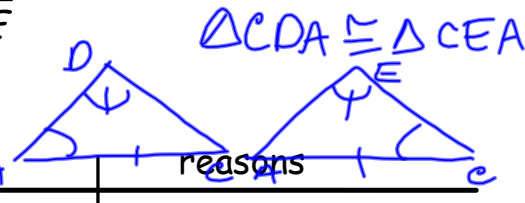


Statements	Reasons
1. E is midpt of \overline{BD}	1. given
2. $\overline{BE} \cong \overline{ED}$	2. def of midpt.
3. $\overline{AB} \parallel \overline{CD}$	3. given
4. $\angle B \cong \angle D$	4. If Parallel lines are cut by a transversal, the alt int angles \cong .
5. $\angle BEA \cong \angle DEC$ are vertical \angle 's	5. def of vertical \angle 's
6. $\triangle BEA \cong \triangle DEC$	6. vertical \angle 's \cong
7. $\triangle ABE \cong \triangle CDE$	7. ASA \cong ASA

Ex. 2 Given: Isosceles $\triangle ABC$, base \overline{AC}

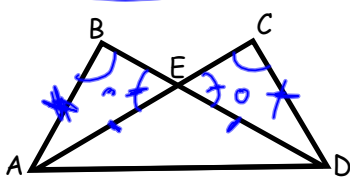
$$\overline{CD} \perp \overline{BA}, \overline{AE} \perp \overline{BC}$$

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



statements	reasons
1. Isosceles $\triangle ABC$, base \overline{AC}	1. given
2. $\overline{AB} \cong \overline{BC}$	2. def of Isosceles \triangle
3. $\angle BAC \cong \angle BCA$	3. Isosceles \triangle Theorem.
4. $\overline{CD} \perp \overline{BA}, \overline{AE} \perp \overline{BC}$	4. given
5. $\angle CDA$ & $\angle AEC$ are $\text{Rt}\angle$	5. def of \perp lines
6. $\angle CDA \cong \angle AEC$	6. all $\text{Rt}\angle$'s \cong
7. $\overline{AC} \cong \overline{AC}$	7. Reflexive.
8. $\triangle CDA \cong \triangle CEA$	8. AAS \cong AAS
	9. $\overline{CD} \cong \overline{AE}$ c.p.c.c

Ex. 3 Given: $\overline{AB} \perp \overline{BD}$
 $\overline{AC} \perp \overline{CD}$
 $\overline{AB} \cong \overline{CD}$



Prove: $\triangle AED$ is isosceles

Statements	Reasons
1. $\overline{AB} \perp \overline{BD}, \overline{AC} \perp \overline{CD}$	1. given
2. $\angle B$ & $\angle C$ are $\text{Rt}\angle$	2. def of \perp lines
3. $\angle B \cong \angle C$	3. all $\text{Rt}\angle$'s \cong
4. $\overline{AB} \cong \overline{CD}$	4. given
5. $\angle BEA$ & $\angle CED$ are Vertical \angle	5. def of vertical \angle 's
6. $\angle BEA \cong \angle CED$	6. Vertical \angle 's are \cong
7. $\triangle BEA \cong \triangle CED$	7. AAS \cong AAS
8. $\overline{AE} \cong \overline{ED}$	8. c.p.c.c
9. $\triangle AED$ is isosceles	9. def of isosceles \triangle .