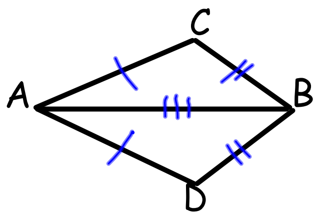
Geometry Congruence of line segments, angles, and triangles

Notes 4- 7 Proving triangles congruent by SSS

Side-Side-Side (SSS) Two triangles are congruent if the sides of one triangle are congruent respectively, to the three sides of the other triangle.

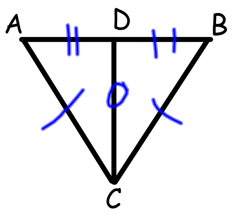


$\overline{AC} \cong \overline{AD}$

$\overline{CB} \cong \overline{DB}$

$\overline{AB} \cong \overline{AB}$

Ex. 1



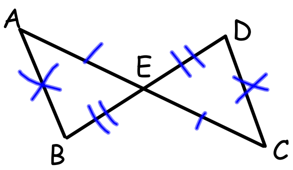
Given: $\overline{AC} \cong \overline{BC}$

D is the midpoint of $\overline{AB}$

Prove: $\Delta ADC \cong \Delta BCD$

statement	reason
1. $\overline{AC} \cong \overline{BC}$	1. given
2. D is midpt of $\overline{AB}$	2. given
3 $\overline{AD} \cong \overline{DB}$	3. If a pt is midpt of a segment, it divides the segment into 2 ≅ segments.
4. $\overline{DC} \cong \overline{DC}$	4. a quantity is = to itself
5 $\Delta ADC \cong \Delta BCD$	5. SSS ≅ SSS

Ex. 2



Given:

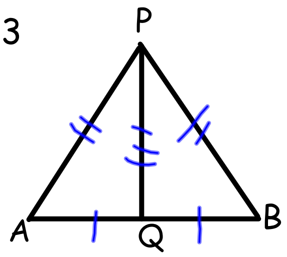
$\overline{AC}$ and $\overline{BD}$ bisect each other at E

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

Prove: $\Delta ABE \cong \Delta CDE$

statement	reason
1. $\overline{AC}$ & $\overline{BD}$ bisect each other at E	1. given
2. E is midpt of $\overline{AC}$ & $\overline{BD}$	2. If a segment bisects another segment, ~~it divides it into 2 ≅ segments~~ it intersects at midpt.
3. $\overline{AE} \cong \overline{EC}$, $\overline{BE} \cong \overline{ED}$	3) Def of midpt
4. $\overline{AB} \cong \overline{CD}$	4) given
5. $\Delta ABE \cong \Delta CDE$	5) SSS ≅ SSS

Ex. 3



Given: $\overline{AQ} \cong \overline{PQ}$

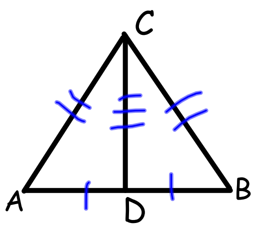
$\overline{BQ} \cong \overline{PQ}$

$\overline{AP} \cong \overline{BP}$

Prove: $\Delta APQ \cong \Delta BPQ$

statement	reason
1. $\overline{AQ} \cong \overline{PQ}$	1. given
2. $\overline{BQ} \cong \overline{PQ}$	2. given
3. $\overline{AQ} \cong \overline{BQ}$	3. Trans. or Subst.t.
4. $\overline{AP} \cong \overline{BP}$	4. given
5. $\overline{PQ} \cong \overline{PQ}$	5. a quantity is $\cong$ to itself
6. $\Delta APQ \cong \Delta BPQ$	6. SSS $\cong$ SSS

Ex. 4



Given: ΔABC is isosceles

D is the midpoint of $\overline{AB}$

Prove: $\Delta ACD \cong \Delta BCD$

statement	reason
1. D is midpt of $\overline{AB}$	1. given
2. $\overline{AD} \cong \overline{DB}$	2. def of midpt.
3. ΔABC is isosceles	3. given
4. $\overline{AC} \cong \overline{BC}$	4. If a Δ is isosceles it has 2 $\cong$ sides
5. $\overline{DC} \cong \overline{DC}$	5. Reflexive
6. $\Delta ADC \cong \Delta BDC$	6. SSS $\cong$ SSS