Key

4.6 Use Congruent Triangles

Term	Definition	Example
Definition of Congruent Triangles (CPCTC)	Two triangles are congruent if and only if their corresponding parts are congruent. This is also known as the Corresponding Parts of Congruent Triangles are Congruent Theorem.	if $\triangle ABC \cong \triangle DEF$ then $\angle A \cong \angle D$ $\quad \overline{AB} \cong \overline{DE}$ $\angle B \cong \angle E$ $\quad \overline{BC} \cong \overline{EF}$ $\angle C \cong \angle F$ $\quad \overline{AC} \cong \overline{DF}$

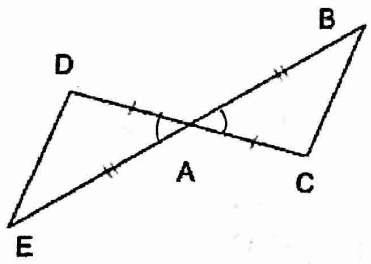
To show that a pair of corresponding parts of two triangles are congruent:

1. **Prove the two triangles are congruent using** SSS, HL, AAS, ASA, **or** SAS.
2. **Use the definition of congruent triangles (CPCTC) to show the corresponding parts are congruent.**

What can we say about SSA and AAA?	
SSA	SSA cannot be used as a proof of congruent triangles. See page 247.
AAA	AAA cannot be used as a proof of congruent triangles. AAA only proves the two triangles to be *similar*.

Examples:

1.

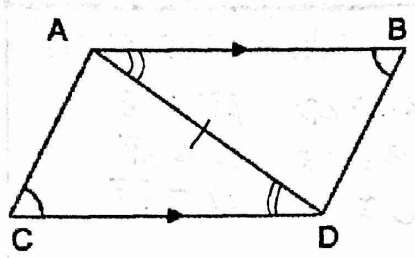


Tell which triangles you can show are congruent in order to prove the statement. What postulate or theorem would you use? $\triangle ADE \cong \triangle ACB$ by SAS

Prove $\angle D \cong \angle C$.

Statements	reasons
(1) $\overline{DA} \cong \overline{CA}$, $\overline{EA} \cong \overline{BA}$	(1) Given
(2) $\angle DAE \cong \angle CAB$	(2) vertical $\angle$'s thm
(3) $\triangle ADE \cong \triangle ACB$	(3) SAS
(4) $\angle D \cong \angle C$	(4) CPCTC

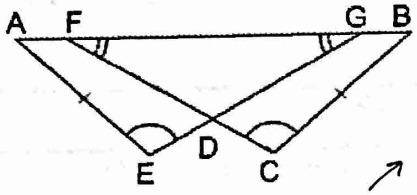
2.



Tell which triangles you can show are congruent in order to prove the statement. What postulate or theorem would you use? $\triangle CDA \cong \triangle BAD$ by AAS

$\overline{AC} \cong \overline{BD}$ by the CPCTC

3.



c)

statements	reasons
① $\angle E \cong \angle C$, $\overline{AE} \cong \overline{BC}$, $\angle F \cong \angle G$	① given
② $\triangle AEG \cong \triangle BCF$	② AAS
③ $\overline{FB} \cong \overline{GA}$	③ CPCTC

a) Tell which triangles you can show are congruent in order to prove the statement. $\triangle AEG \cong \triangle BCF$

b) What postulate or theorem would you use? AAS

c) Prove $\overline{FB} \cong \overline{GA}$

4. Given: $\angle 1 \cong \angle 2$, $\overline{AB} \cong \overline{DE}$

Prove: $\overline{DC} \cong \overline{AC}$

S	r
① $\angle 1 \cong \angle 2$, $\overline{AB} \cong DE$	① given
② $\angle ACB \cong \angle DCE$	② vertical $\angle$'s thm
③ $m\angle 1 + m\angle ABC = 180$, $m\angle 2 + m\angle DEC = 180$	③ Linear Pair Thm
④ $m\angle 1 + m\angle ABC = m\angle 2 + m\angle DEC$	④ substitution/ transitive prop of =
⑤ $m\angle ABC = m\angle DEC$	⑤ subtraction
⑥ $\angle ABC \cong \angle DEC$	⑥ Def of $\cong$ $\angle$'s
⑦ $\triangle ABC \cong \triangle DEC$	⑦ AAS
⑧ $\overline{DC} \cong \overline{AC}$	⑧ CPCTC