

## Using Congruent Triangles

Lesson Objective

INBAT prove that corresponding parts of congruent triangles are congruent

**Remember:** Congruent triangles have congruent corresponding parts.

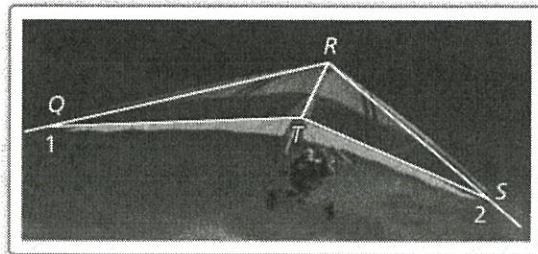
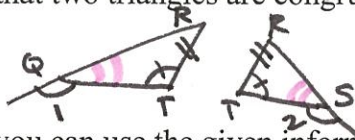
So, if you can prove that two triangles are congruent, then you know that their corresponding parts must be congruent as well!

Examples

1. Explain how you can use the given information to prove that the hang glider parts are congruent.

**Given:**  $\angle 1 \cong \angle 2$ ,  $\angle RTQ \cong \angle RTS$

**Prove:**  $\overline{QT} \cong \overline{ST}$



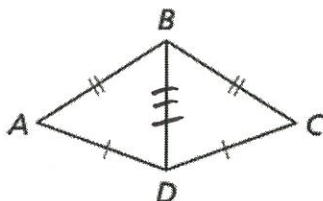
**\*\*HINT:** If you can show that  $\triangle QRT \cong \triangle STR$ , then you know that  $\overline{QT} \cong \overline{ST}$  since these side are corresponding!

| Statements                            | Reasons                                                       |
|---------------------------------------|---------------------------------------------------------------|
| ① $\angle 1 \cong \angle 2$           | ① Given                                                       |
| $\angle RTQ \cong \angle RTS$         |                                                               |
| ② $\overline{RT} \cong \overline{RT}$ | ② reflex. prop. $\cong$                                       |
| ③ $\angle RQT \cong \angle RST$       | ③ $\cong$ supps. thm                                          |
| ④ $\triangle RQT \cong \triangle RST$ | ④ AAS $\cong$ (1, 3, 2)                                       |
| ⑤ $\overline{QT} \cong \overline{ST}$ | ⑤ corresp. parts of $\cong$ $\triangle$ s are $\cong$ (CPCTC) |

2. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\angle A \cong \angle C$

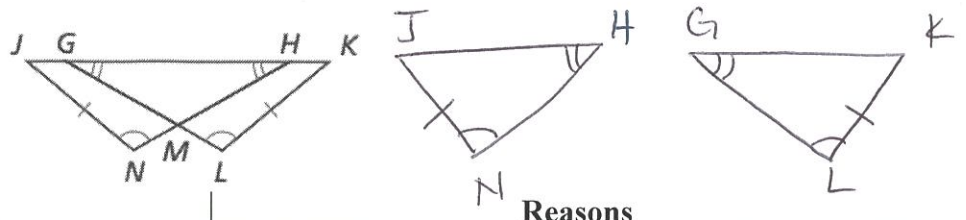


| Statements                            | Reasons                 |
|---------------------------------------|-------------------------|
| ① $\overline{AB} \cong \overline{CB}$ | ① Given                 |
| $\overline{AD} \cong \overline{CD}$   |                         |
| ② $\overline{BD} \cong \overline{BD}$ | ② reflex. prop. $\cong$ |
| ③ $\triangle BAD \cong \triangle BCD$ | ③ SSS $\cong$ (1, 1, 2) |
| ④ $\angle A \cong \angle C$           | ④ CPCTC                 |

3. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\overline{GK} \cong \overline{HJ}$



Statements

Reasons

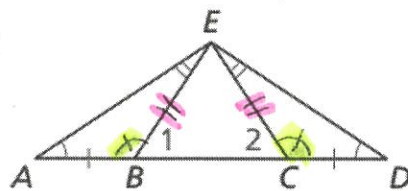
- ①  $\overline{JN} \cong \overline{KN}$ ,  $\angle JNH \cong \angle KNL$ ,  
 $\angle JHN \cong \angle KGL$
- ②  $\triangle JHN \cong \triangle KGL$
- ③  $\overline{GK} \cong \overline{HJ}$

- ① Given
- ② AAS  $\cong$  (1, 1, 1)
- ③ CPCTC

4. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\angle 1 \cong \angle 2$



\*\*There are at least TWO different ways to write this proof: one with  $\cong$   $\Delta$ s and CPCTC, one without.

Challenge yourself! Try to write both proofs ☺

Statements

Reasons

- ①  $\angle A \cong \angle D$   
 $\overline{AB} \cong \overline{DC}$   
 $\angle AEB \cong \angle DEC$
- ②  $\triangle AEB \cong \triangle DEC$
- ③  $\overline{EB} \cong \overline{EC}$
- ④  $\angle 1 \cong \angle 2$

- ① Given
- ② AAS  $\cong$  (1, 1, 1)
- ③ CPCTC
- ④  $\text{if } \Delta \rightarrow \Delta$

Statements

Reasons

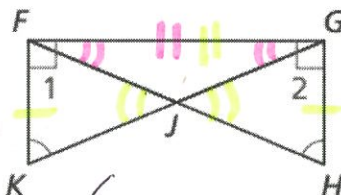
- ①  $\angle A \cong \angle D$   
 $\angle AEB \cong \angle DEC$
- ②  $\angle EBA \cong \angle ECD$
- ③  $\angle 1 \cong \angle 2$

- ① Given
- ② Third  $\angle$ 's Thm
- ③  $\cong$  Supp. Thm

5. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\angle 1 \cong \angle 2$  ( $\angle KFG \cong \angle HGF$ )



\*\*There are at least TWO different ways to write this proof: one using  $\cong$   $\Delta$ s and CPCTC once, one using  $\cong$   $\Delta$ s and CPCTC twice. Challenge yourself! Try to write both proofs ☺

Statements

Reasons

- ①  $\angle K \cong \angle H$   
 $\angle KFG \cong \angle HGF$
- ②  $\overline{FG} \cong \overline{GF}$
- ③  $\triangle KFG \cong \triangle HGF$
- ④  $\angle GFH \cong \angle FGH$
- ⑤  $\angle 1 \cong \angle 2$

- ① Given
- ② reflex. prop.  $\cong$
- ③ AAS  $\cong$  (1, 1, 2)
- ④ CPCTC
- ⑤  $\cong$  comp. thm

Statements

Reasons

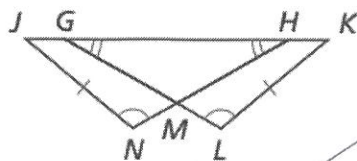
- ①  $\angle K \cong \angle H$   
 $\angle KFG \cong \angle HGF$
- ②  $\overline{FG} \cong \overline{GF}$
- ③  $\triangle KFG \cong \triangle HGF$
- ④  $\overline{FK} \cong \overline{GH}$
- ⑤  $\angle FJK \cong \angle GJH$
- ⑥  $\triangle FJK \cong \triangle GJH$
- ⑦  $\angle 1 \cong \angle 2$

- ① Given
- ② reflex. prop.  $\cong$
- ③ AAS  $\cong$  (1, 1, 2)
- ④ CPCTC
- ⑤ vert.  $\angle$ 's  $\cong$
- ⑥ AAS  $\cong$  (1, 5, 4)
- ⑦ CPCTC

3. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\overline{GK} \cong \overline{HJ}$



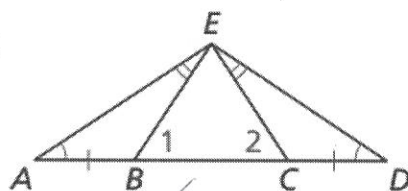
Statements

Reasons

4. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\angle 1 \cong \angle 2$



\*\*There are at least TWO different ways to write this proof: one with  $\cong$   $\Delta$ s and CPCTC, one without. Challenge yourself! Try to write both proofs ☺

Statements

Reasons

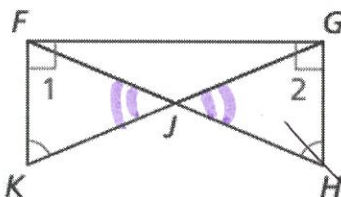
Statements

Reasons

5. Write a two-column proof.

**Given:** the diagram

**Prove:**  $\angle 1 \cong \angle 2$  ( $\angle K F J \cong \angle H G J$ )



\*\*There are at least TWO different ways to write this proof: one using  $\cong$   $\Delta$ s and CPCTC *once*, one using  $\cong$   $\Delta$ s and CPCTC *twice*. Challenge yourself! Try to write both proofs ☺

Statements

Reasons

Statements

Reasons

①  $\angle K \cong \angle H$

① Given

②  $\angle FJK \cong \angle GJH$

② vert.  $\angle$ 's  $\cong$

③  $\angle 1 \cong \angle 2$

③ Third  $\angle$ 's Thm

Third proof!!  
☺