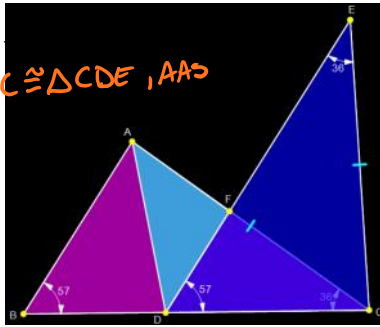


WARM UP

Are any of the following

$\triangle ABC \cong \triangle CDE$, AAS



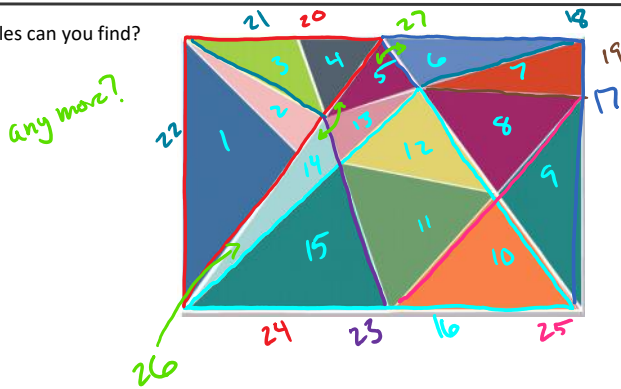
ESSENTIAL QUESTION

Which theorems can be used to prove that two overlapping triangles are congruent?

GOAL: "I CAN. . ."

Use triangle congruence to solve problems with overlapping triangles."

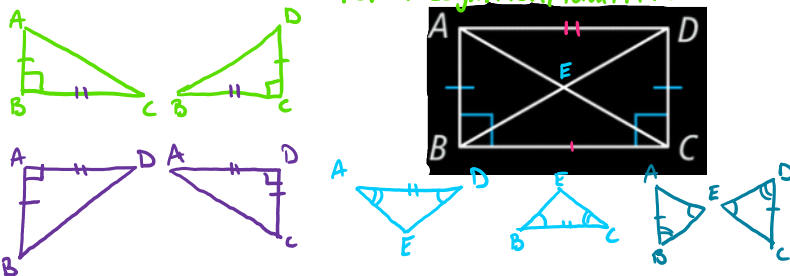
How many triangles can you find?



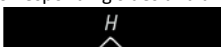
EXAMPLE 1

Figure ABCD is a rectangle with diagonals \overline{AC} and \overline{BD} . Why is it important to identify corresponding parts of overlapping triangles?

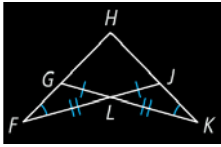
For recognition/identification of \cong .



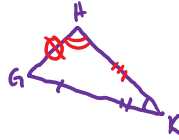
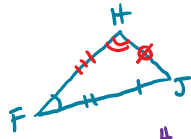
What are the corresponding sides and angles of $\triangle FJH$ and $\triangle KHG$?



What are the corresponding sides and angles of $\triangle FHJ$ and $\triangle KHG$?

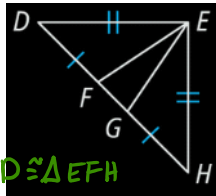


$\overline{HJ}, \overline{HG}$
 $\overline{GK}, \overline{JF}$
 $\overline{FJ}, \overline{KG}$

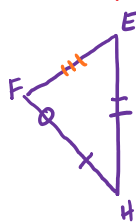


EXAMPLE 2

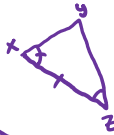
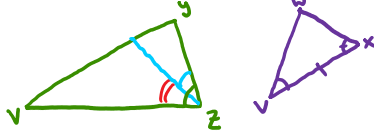
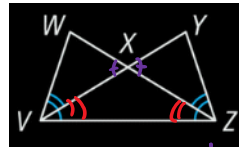
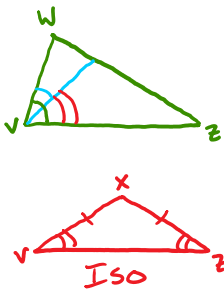
Is $\angle EGD \cong \angle EFH$?



$\triangle EGD \cong \triangle EFH$
 $\therefore \angle EGD \cong \angle EFH$



Are \overline{VW} and \overline{ZY} congruent?

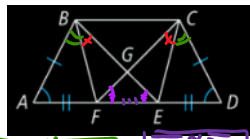


$\triangle XWV \cong \triangle XZY, ASA$
 $\overline{VW} \cong \overline{ZY}, CPCTC$

EXAMPLE 3

Given: $AB \cong DC, AF \cong DE$, and $\angle A \cong \angle D$

Prove: $\triangle BFE \cong \triangle CEF$



$AB \cong DC$
 $AF \cong DE$
 $\angle A \cong \angle D$
 Given

$\triangle ABF \cong \triangle CDE$
 SAS

$\angle ABF \cong \angle DCE$
 CPCTC

$FE \cong FE$
 Reflexive

$\triangle ABE \cong \triangle DCF$
 SAS

$m\angle ABE = m\angle ABF + m\angle FBE$
 $m\angle ABE = m\angle ABF + m\angle ECF$
 Subst. POE

$\angle ABE \cong \angle DCF$
 CPCTC

$m\angle ABE = m\angle ABF + m\angle FBE$
 $m\angle DCF = m\angle DCE + m\angle ECF$
 Angle Addition

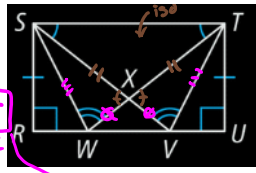
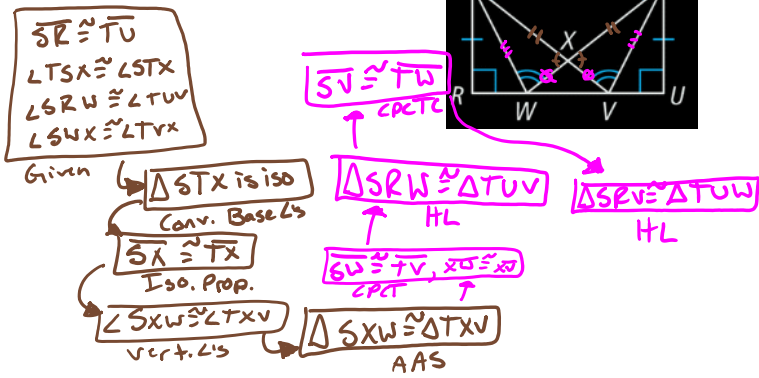
$m\angle FBE = m\angle ABE - m\angle ABF$
 $m\angle ECF = m\angle ABE - m\angle ABF$
 Subst. POE

$m\angle FBE = m\angle ECF$
 Trans. POE

$\angle BEF \cong \angle CFE, \angle ABE \cong \angle DCF$
 CPCTC

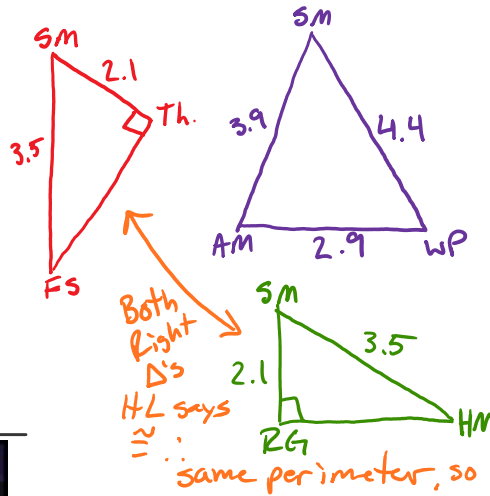
$\triangle BFE \cong \triangle CEF$
 AAS

Write a proof to show that $\triangle SRV \cong \triangle TUW$.

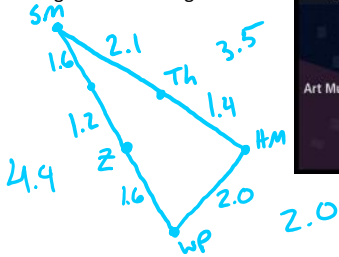
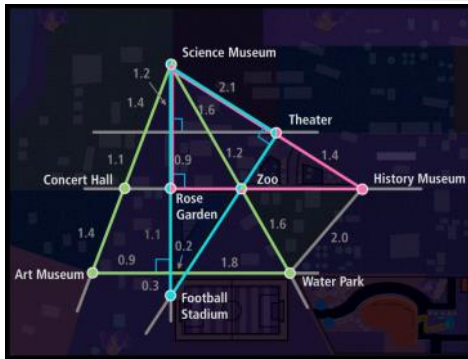


EXAMPLE 4

A city runs three triangular bus routes to various attractions. How can you draw a separate triangle for each route? Are any of the routes the same length?



A new route will stop at the History Museum, Water Park, Zoo, Science Museum, and Theater. Draw a triangle to represent the new route. Include any length or angle information that is given in the diagram.



Congruence in Overlapping Triangles

All congruence criteria can be applied to overlapping triangles.

THEOREM 4-4

Side-Side-Side (SSS)

If...

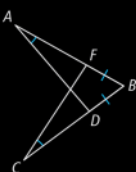


Then... $\triangle KLM \cong \triangle MJK$ and $\triangle LMJ \cong \triangle JKL$

THEOREM 4-6

Angle-Angle-Side (AAS)

If...

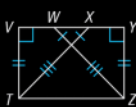


Then... $\triangle ABD \cong \triangle CBF$

THEOREM 4-7

Hypotenuse-Leg (HL) Theorem

If...



Then... $\triangle VXT \cong \triangle YWZ$

HOMEWORK

Pg. 192

12, 13, 16-21, 27, 28
