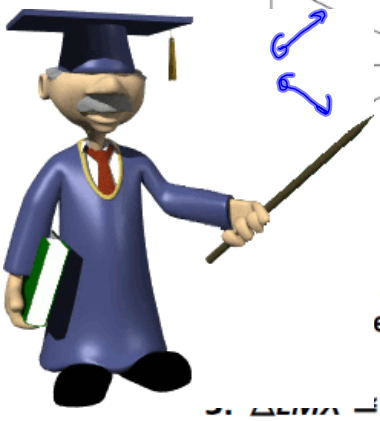
For Exercises 1 and 2, tell whether the HL Theorem can be used to prove the triangles congruent. If so, explain. If not, write *not possible*.

1.

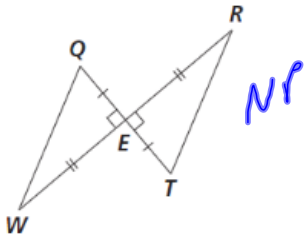


① ≅ Hyp $\overline{CD} \cong \overline{AC}$

② ≅ Legs $\overline{BC} \cong \overline{BC}$

③ Rt ∠'s $\angle ABC, \angle DBC$

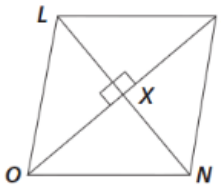
2.



NP

3 and 4, what additional information do you e the triangles congruent by the HL Theorem?

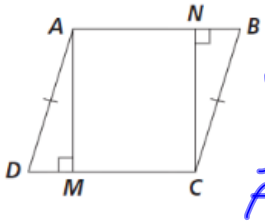
3. $\triangle LMX \cong \triangle LOX$



$\overline{LO} \cong \overline{LM}$

≅ Hyp

4. $\triangle AMD \cong \triangle CNB$



$\overline{DM} \cong \overline{NB}$ or $\overline{AM} \cong \overline{CN}$

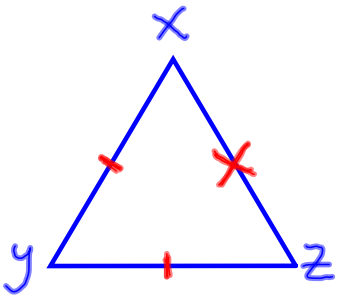
≅ Legs

#39 $\Delta XYZ \cong \Delta ZYX$

$\overline{XY} \cong \overline{ZY}$ same

$\overline{YZ} \cong \overline{YX}$

$\overline{XZ} \cong \overline{ZX}$



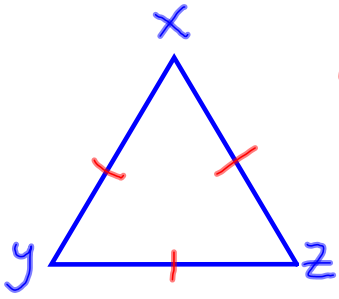
Isos △

#40 $\Delta XYZ \cong \Delta ZXY$

$\overline{XY} \cong \overline{ZX}$

$\overline{YZ} \cong \overline{XY}$

$\overline{XZ} \cong \overline{ZY}$



Equilateral △

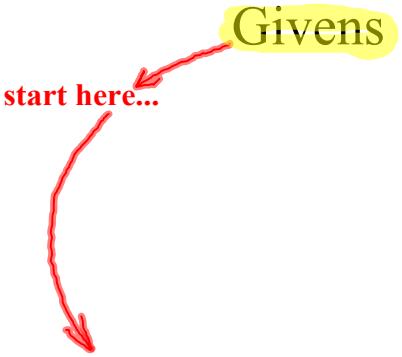
Givens

Goal

~~Givens~~

Goal

Goal

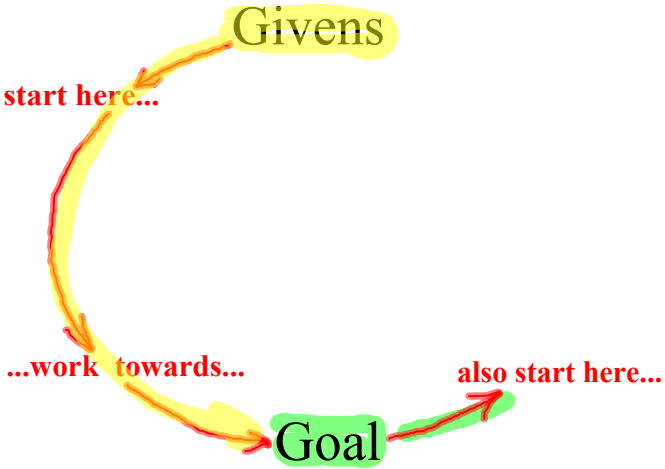


Goal


Givens
start here...
...work towards...
Goal

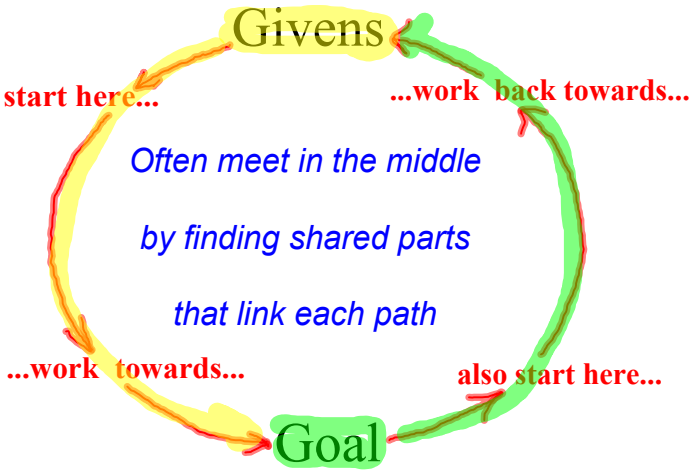

Givens
start here...
...work towards...
Goal


Givens
start here...
...work towards...
Goal


Givens
start here...
...work towards...
also start here...
Goal


Givens
start here...
...work back towards...
...work towards...
also start here...
Goal


Givens
start here...
...work back towards...
...work towards...
also start here...
Goal



Overlapped Δ's...

What is the first step to take in order to solve?

1) Work start⇒end and end⇒start...meet in middle

2) Separate, redraw & relabel (mark ≅ parts)

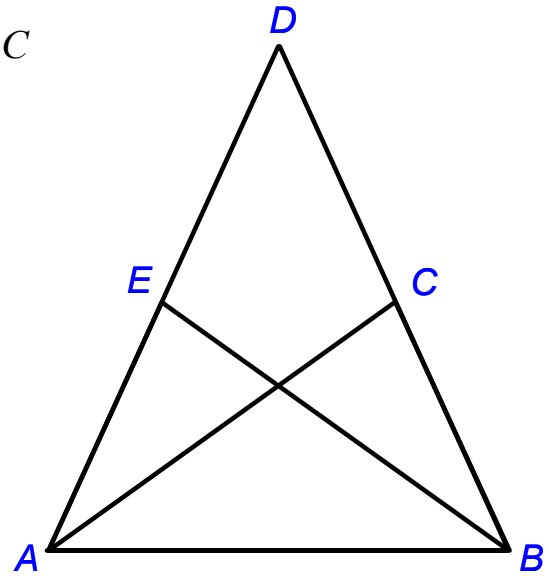
3) Remember: common side/angle is ≅ to itself

4) Look for isos Δ's (≅ sides or ≅ angles)

5) Sometimes: Prove 1 pair Δ's ≅ then use CPCTC

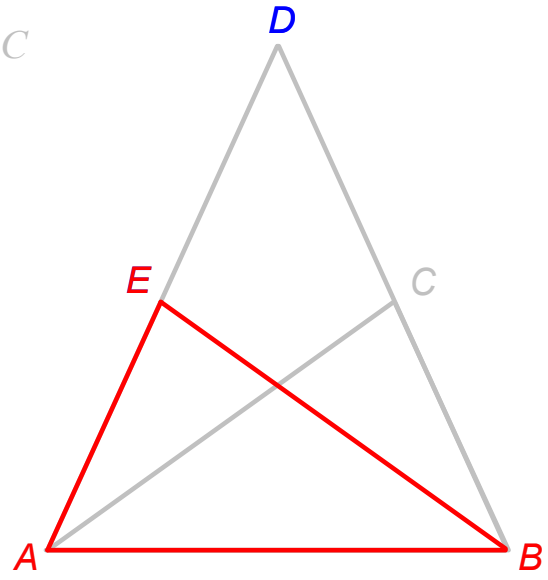
Separate & redraw - Identify any common angles or sides

ΔABE & ΔBAC



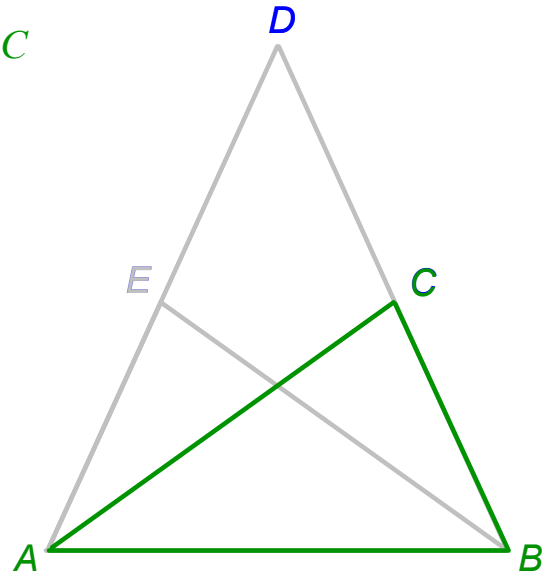
Separate & redraw - Identify any common angles or sides

ΔABE & ΔBAC



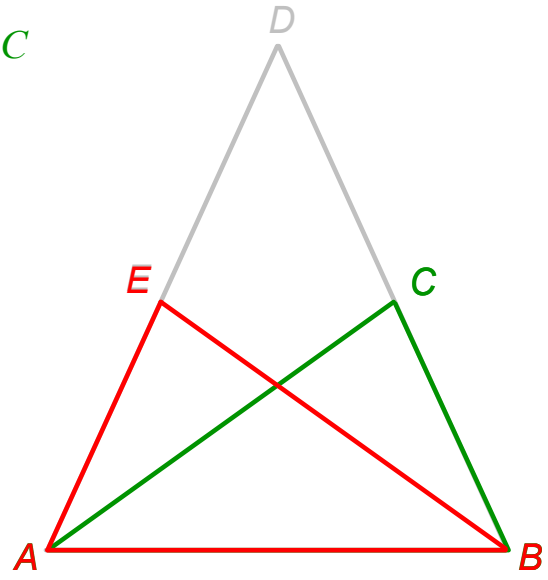
Separate & redraw - Identify any common angles or sides

ΔABE & ΔBAC



Separate & redraw - Identify any common angles or sides

ΔABE & ΔBAC

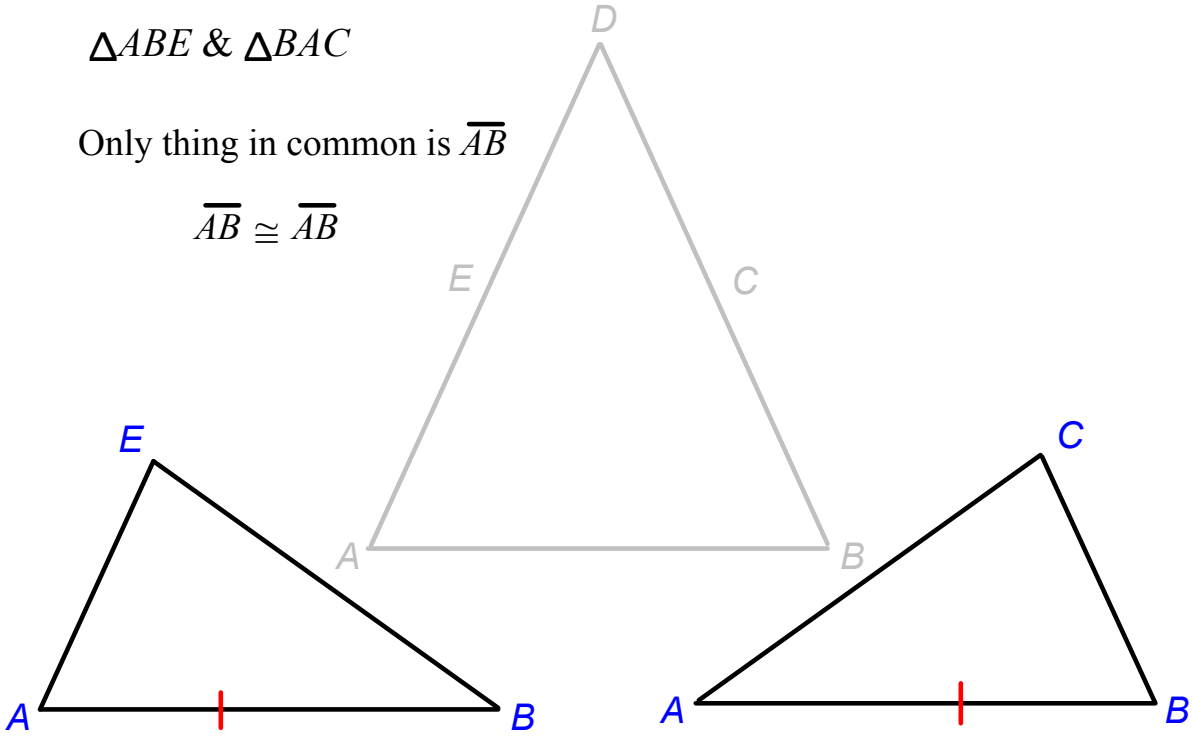


Separate & redraw - Identify any common angles or sides

ΔABE & ΔBAC

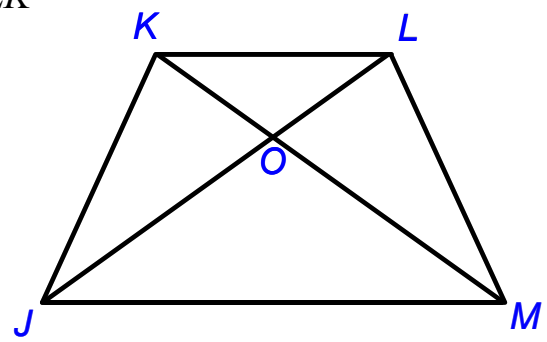
Only thing in common is $\overline{AB}$

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



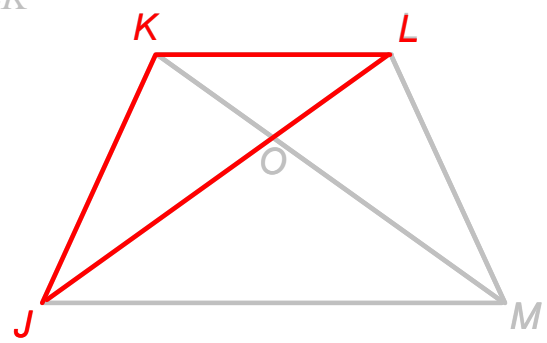
Separate & redraw - Identify any common angles or sides

ΔJKL & ΔMLK



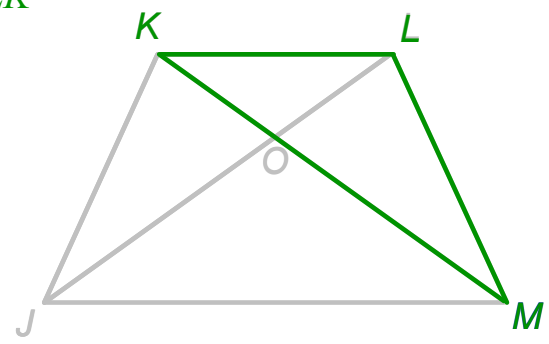
Separate & redraw - Identify any common angles or sides

ΔJKL & ΔMLK



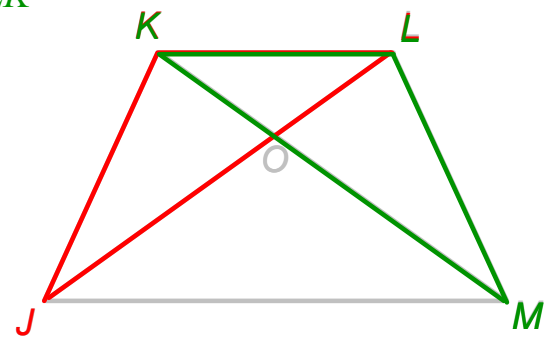
Separate & redraw - Identify any common angles or sides

ΔJKL & ΔMLK



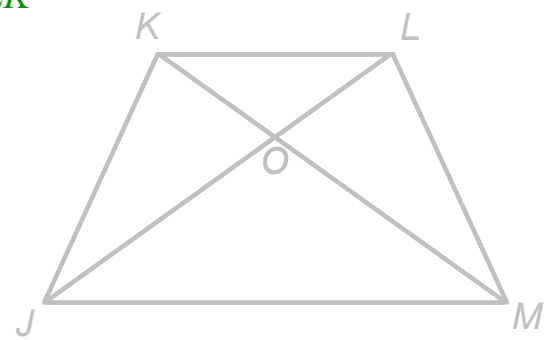
Separate & redraw - Identify any common angles or sides

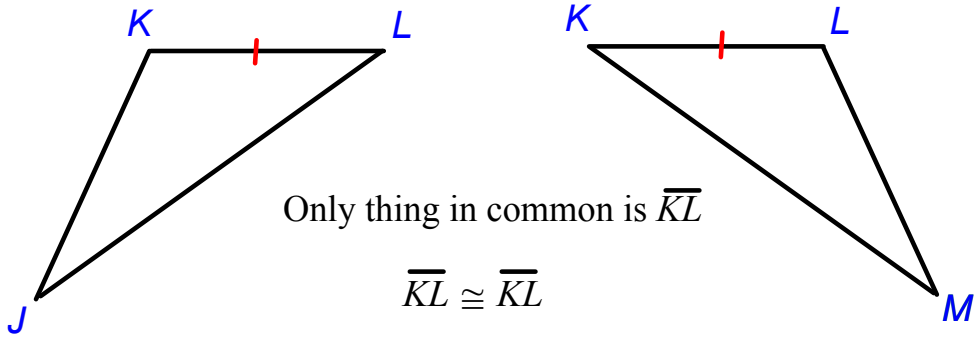
ΔJKL & ΔMLK



Separate & redraw - Identify any common angles or sides

ΔJKL & ΔMLK





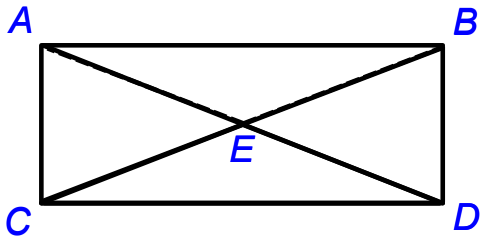
Only thing in common is $\overline{KL}$

$\overline{KL} \cong \overline{KL}$

Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$



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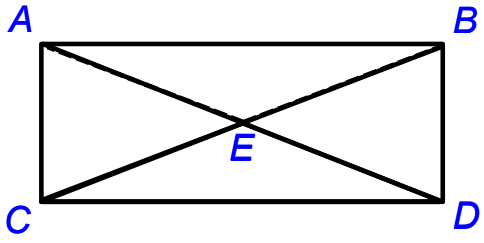
Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$



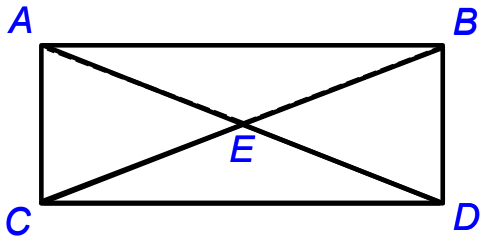
Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

Plan and write a proof

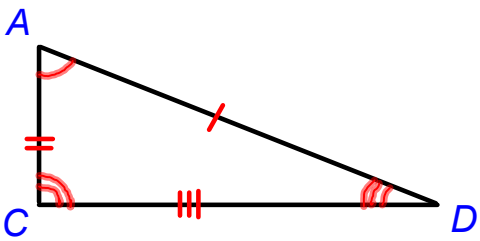
Given $\Delta ACD \cong \Delta BDC$

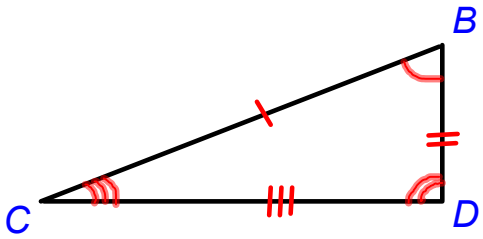
Prove $\overline{CE} \cong \overline{DE}$



Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

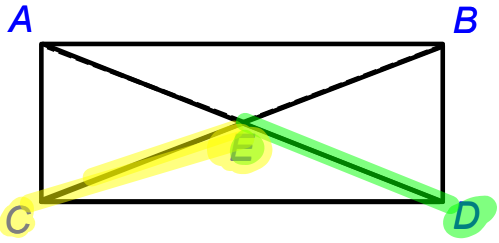




Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

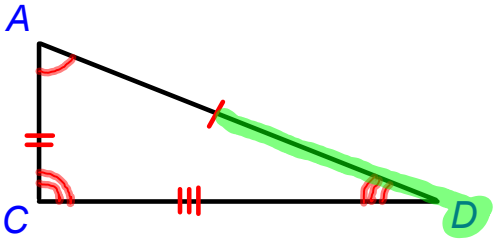
Prove $\overline{CE} \cong \overline{DE}$

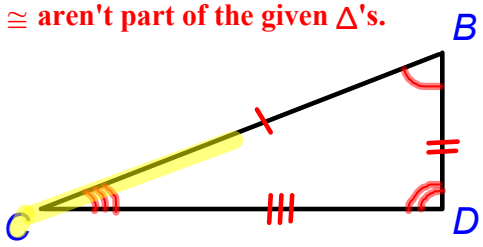


Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.

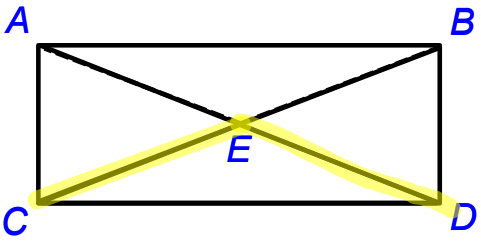




Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

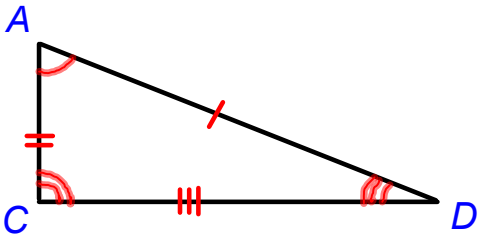


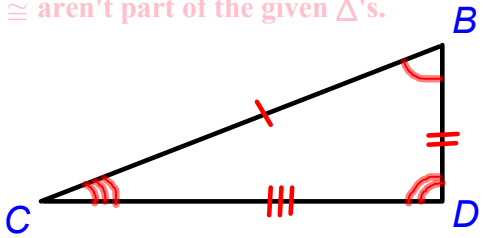
Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.

3) Is there a Δ they are part of?

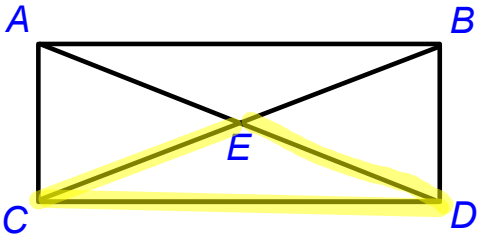




Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

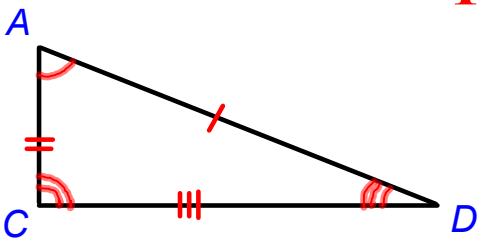


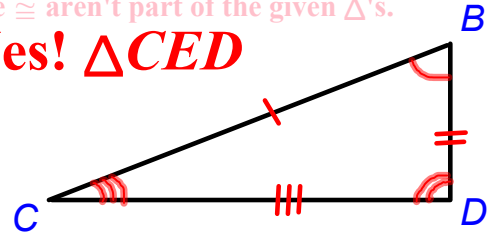
Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.

3) Is there a Δ they are part of? **Yes! ΔCED**

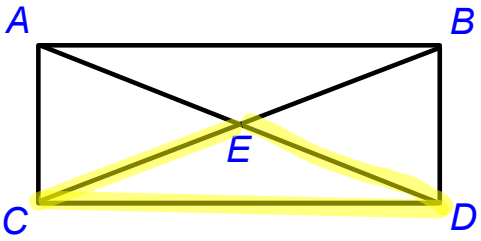




Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

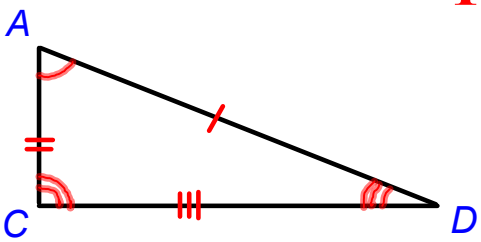


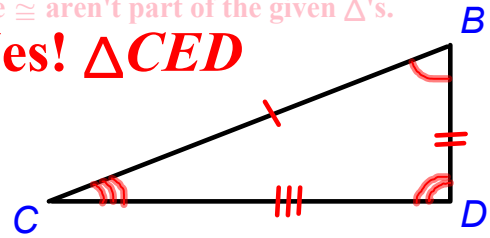
Plan:

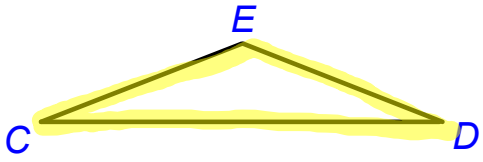
1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.

3) Is there a Δ they are part of? **Yes! Δ*CED***



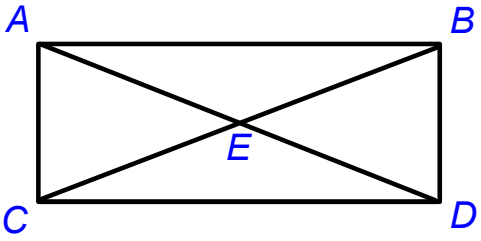




Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

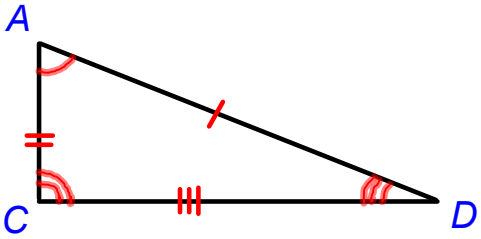


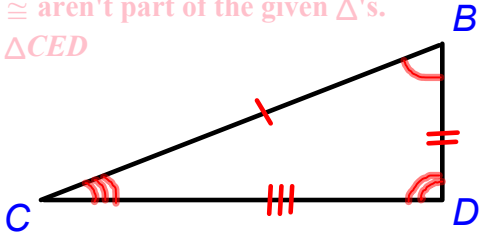
Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.

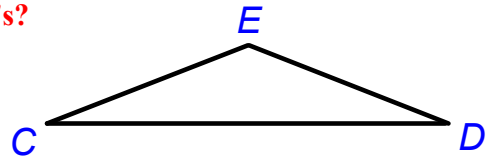
2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.

3) Is there a Δ they are part of? Yes! Δ*CED*





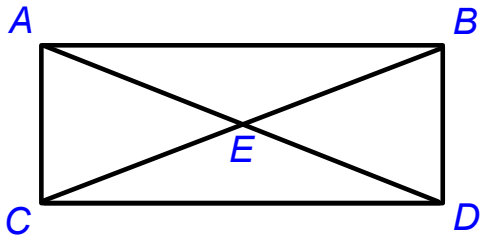
4) How does Δ*CED* relate to the 2 given Δ's?



Plan and write a proof

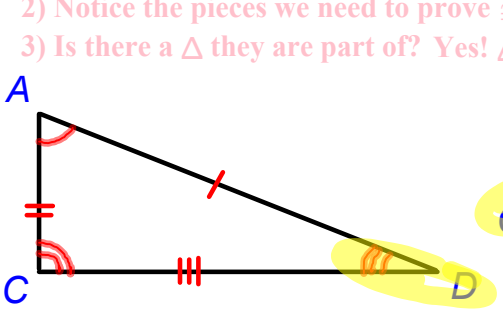
Given $\Delta ACD \cong \Delta BDC$

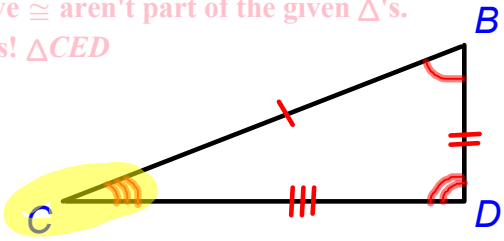
Prove $\overline{CE} \cong \overline{DE}$



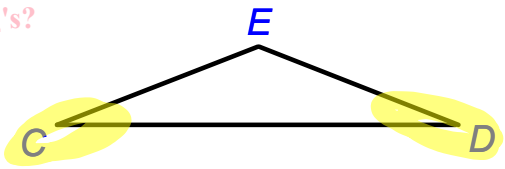
Plan:

1) Separate/redraw given △'s. Use CPCTC to mark ≅ parts.
2) Notice the pieces we need to prove ≅ aren't part of the given △'s.
3) Is there a △ they are part of? Yes! △*CED*





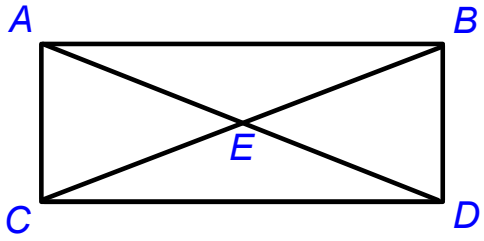
4) How does △*CED* relate to the 2 given △'s?
5) They all share angles *C* & *D*.



Plan and write a proof

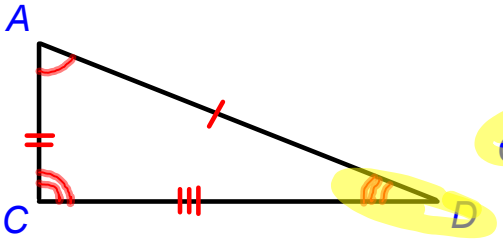
Given $\Delta ACD \cong \Delta BDC$

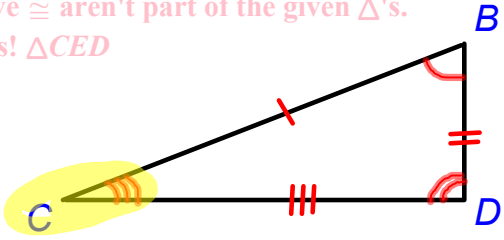
Prove $\overline{CE} \cong \overline{DE}$



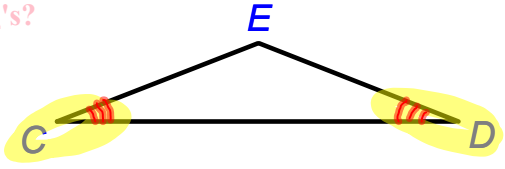
Plan:

1) Separate/redraw given △'s. Use CPCTC to mark ≅ parts.
2) Notice the pieces we need to prove ≅ aren't part of the given △'s.
3) Is there a △ they are part of? Yes! △*CED*





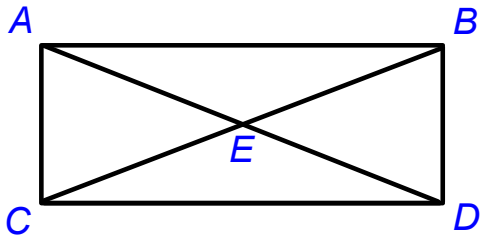
4) How does △*CED* relate to the 2 given △'s?
5) They all share angles *C* & *D*.
6) Hey! ∠*C* ≅ ∠*D*!



Plan and write a proof

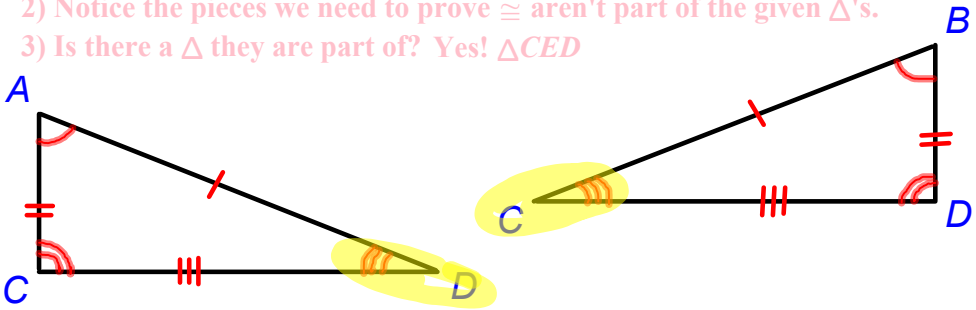
Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

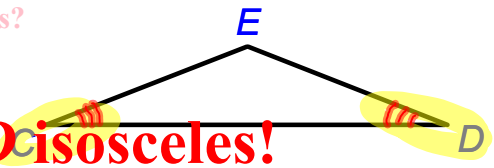


Plan:

1) Separate/redraw given Δ's. Use CPCTC to mark ≅ parts.
2) Notice the pieces we need to prove ≅ aren't part of the given Δ's.
3) Is there a Δ they are part of? Yes! ΔCED



4) How does ΔCED relate to the 2 given Δ's?
5) They all share angles *C* & *D*.
6) Hey! $\angle C \cong \angle D$!

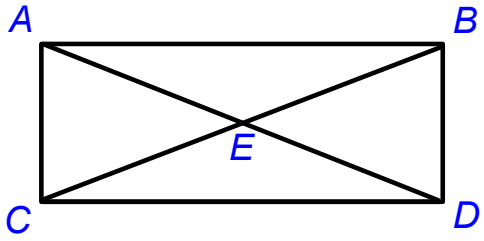


Which makes ΔCED isosceles!

Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$



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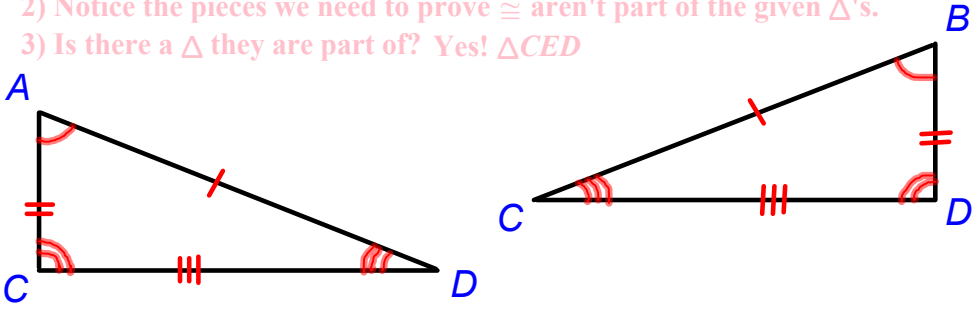
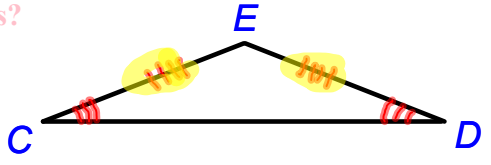


4) How does ΔCED relate to the 2 given Δ's?
5) They all share angles *C* & *D*.
6) Hey! $\angle C \cong \angle D$!
7) ΔCED is an isos $\Delta \Rightarrow \overline{CE} \cong \overline{DE}$

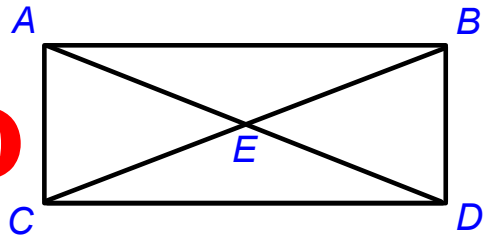


Plan and write a proof

Given $\Delta ACD \cong \Delta BDC$

Prove $\overline{CE} \cong \overline{DE}$

QED



Plan:

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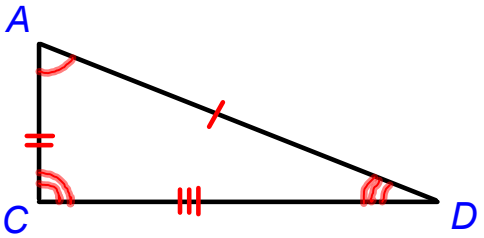

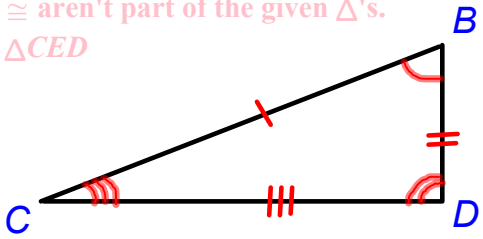

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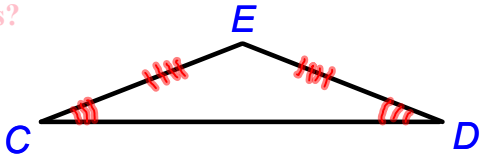
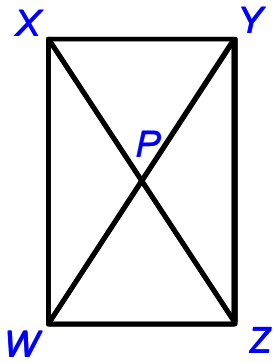


Plan and write a proof

Given $\overline{XW} \cong \overline{YZ}$, $\angle XWZ$ & $\angle YZW$ are rt$\angle$'s

Prove $\Delta XPW \cong \Delta YPZ$



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Prove $\Delta XPW \cong \Delta YPZ$

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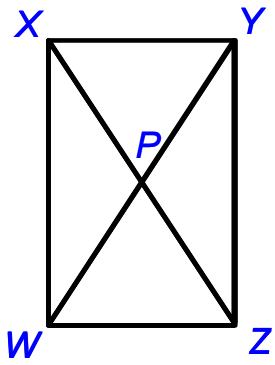

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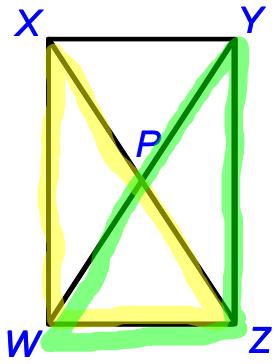

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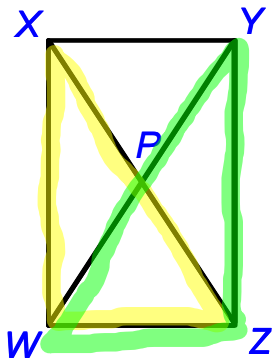
Prove $\Delta XPW \cong \Delta YPZ$

1) Find Δ's containing $\angle$'s XWZ & YZW...Δ's ΔWXZ & ΔZYW

2) Separate, redraw & relabel Δ's ΔWXZ & ΔZYW



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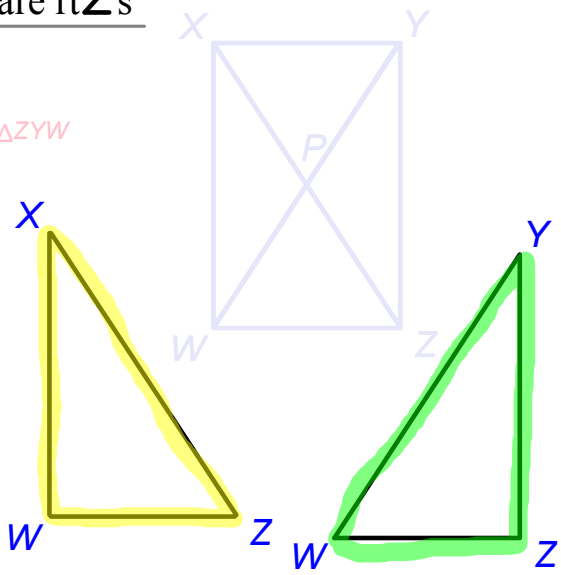

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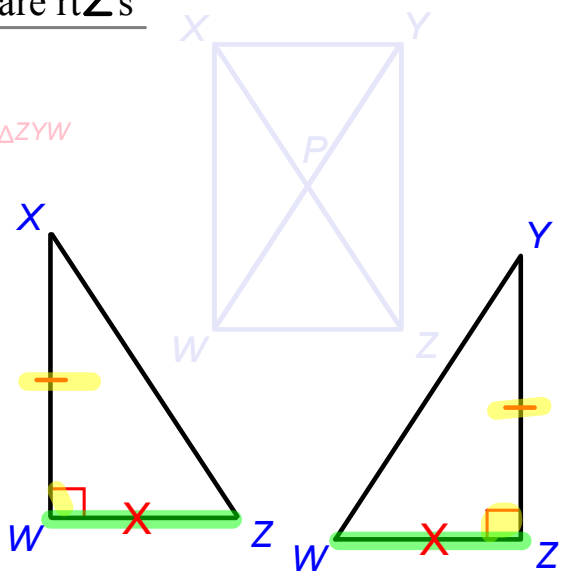

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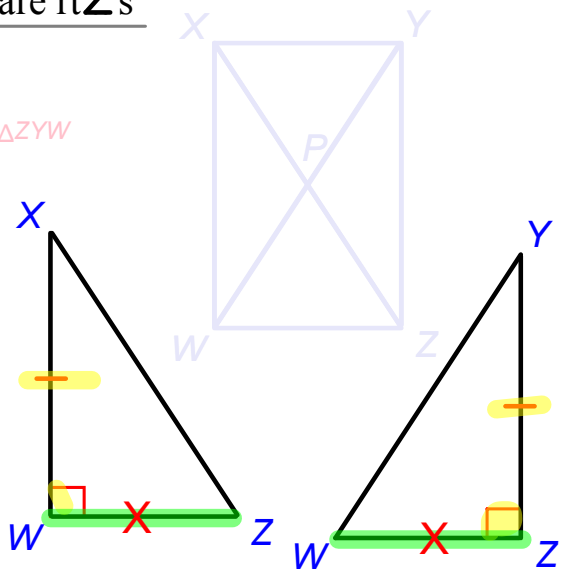
3) Identify congruent (given) and common parts
4) Both Δ's share WZ



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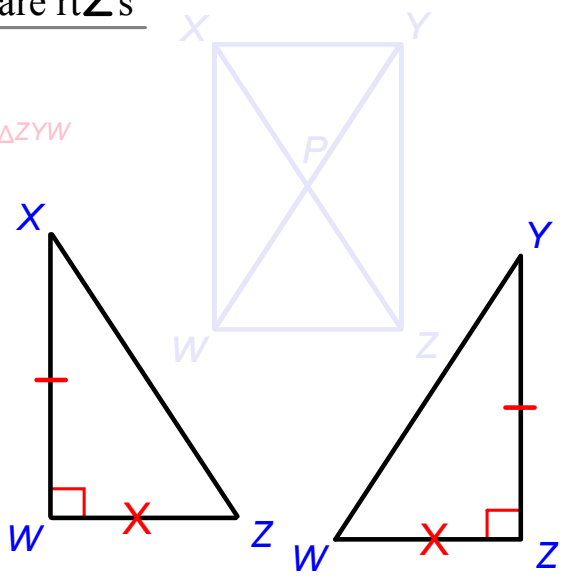
5) $\Delta XWZ \cong \Delta YZW$ by SAS



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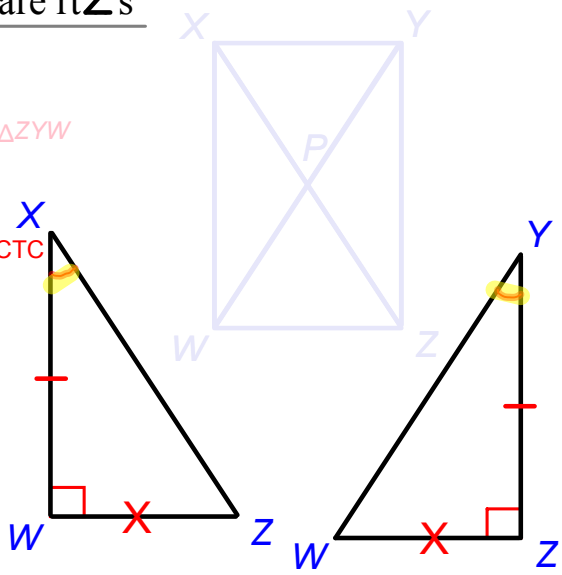

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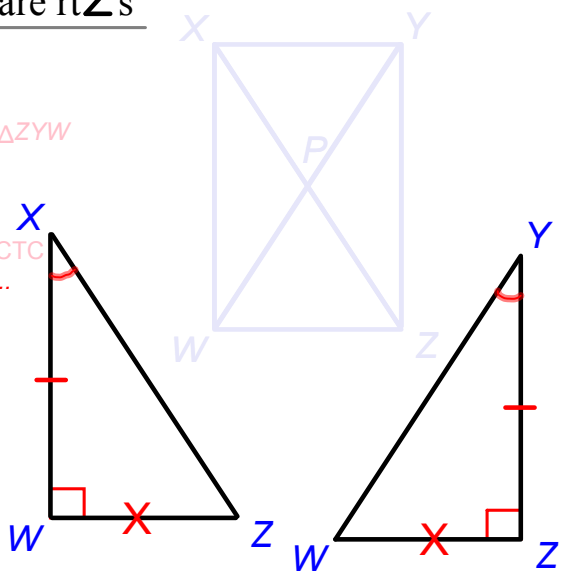

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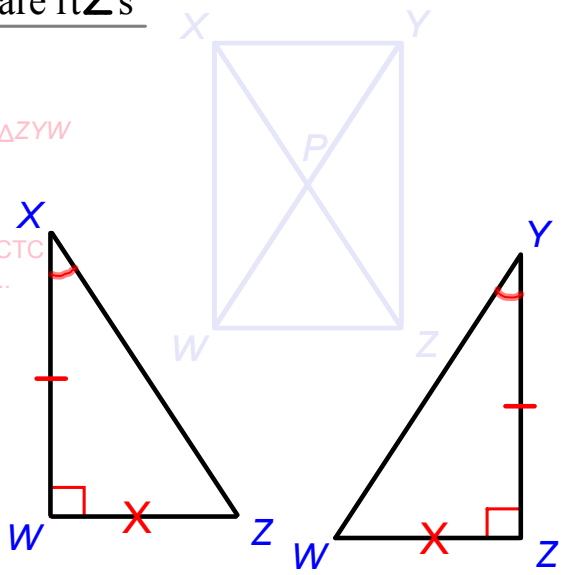

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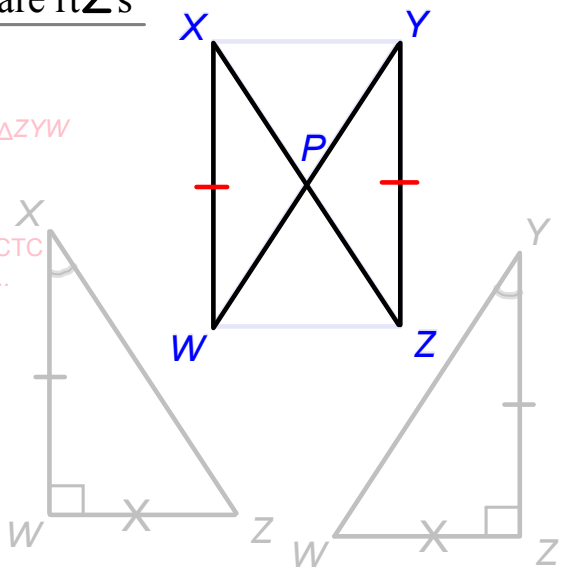

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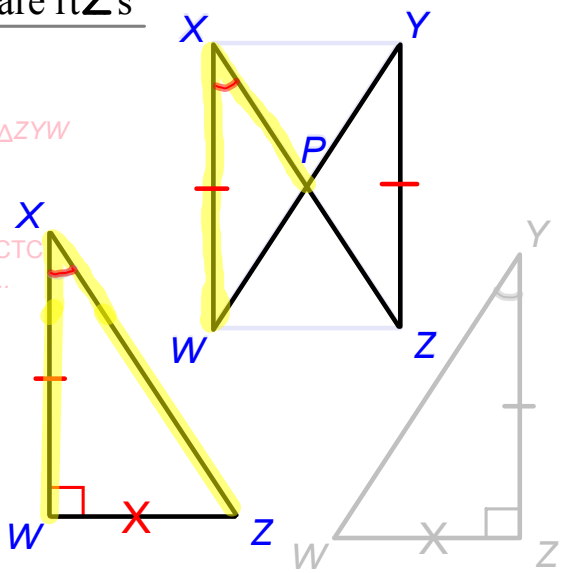
7) Separate redraw & relabel goal ΔXPW & ΔYPZ
8) Notice ΔXPW & ΔWXZ share $\angle WXZ$



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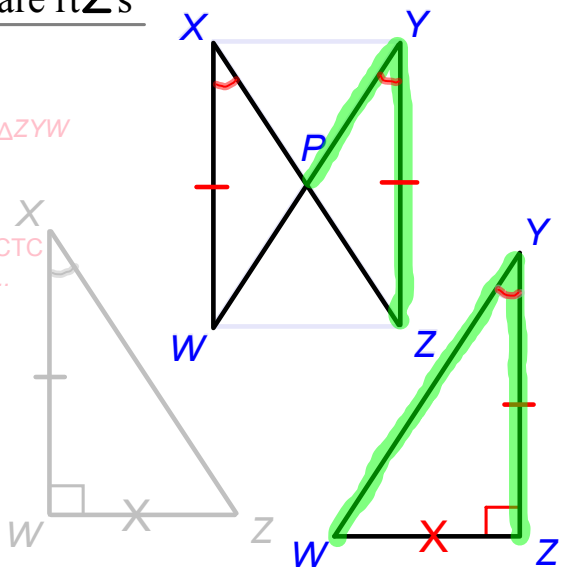

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8) Notice ΔXPW & ΔWXZ share $\angle WXZ$
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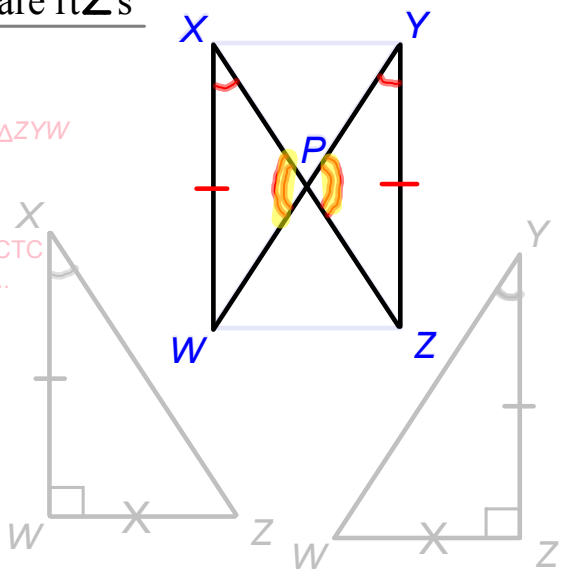
10) $\angle XPW \cong \angle YPZ$ (vertical $\angle$'s)



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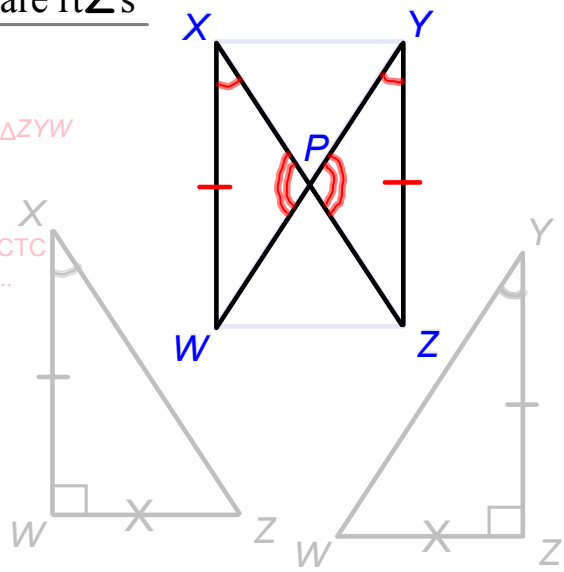

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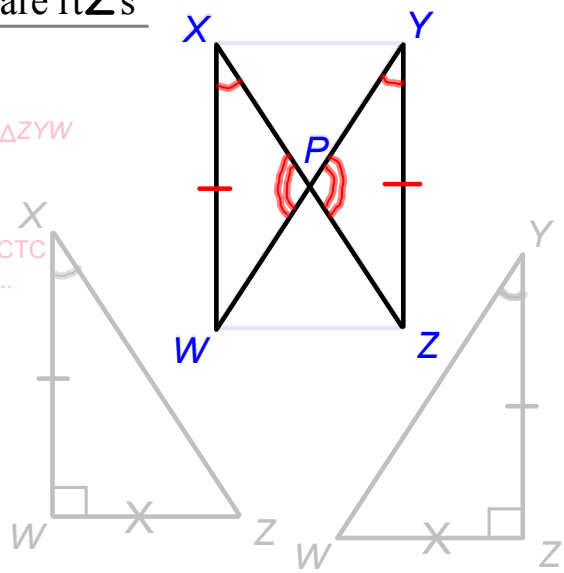
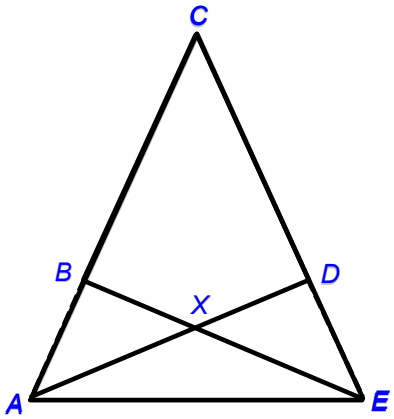
QED



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$



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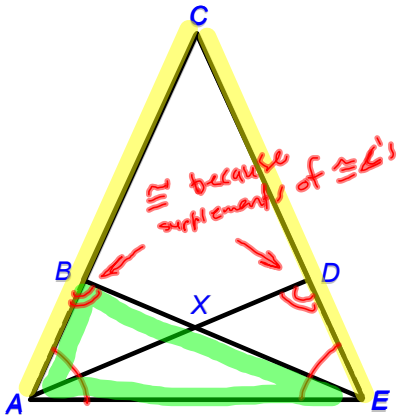
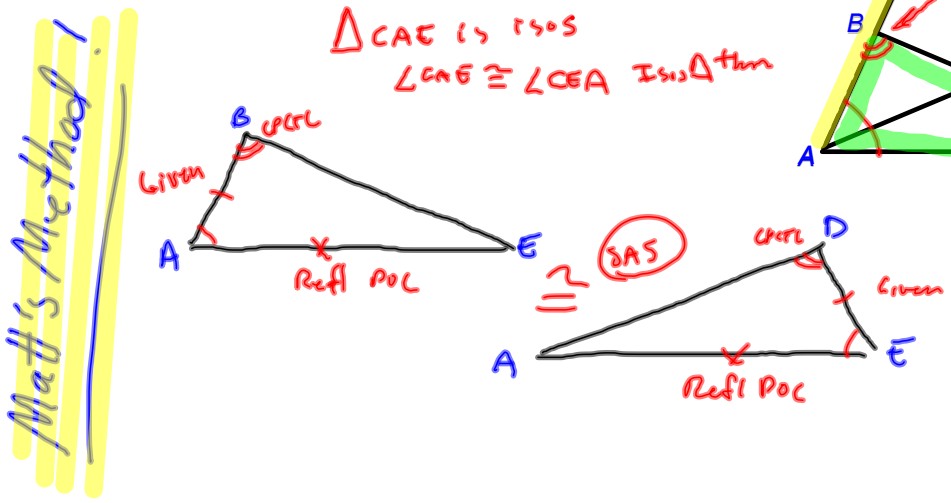


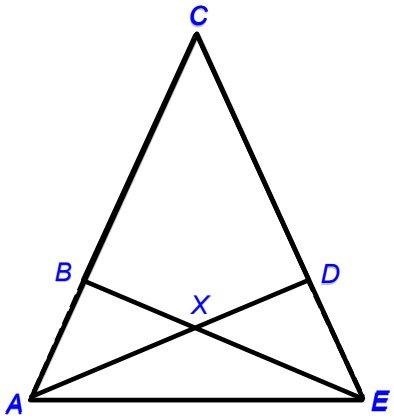


Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

1) Find Δ's containing ∠'s *CBE* & *CDA*



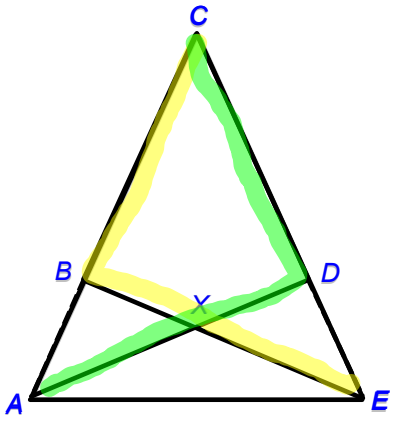
The other method

Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

1) Find Δ's containing ∠'s *CBE* & *CDA*

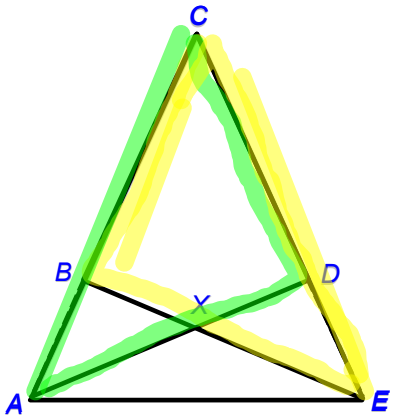


Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

1) Find △'s containing ∠'s *CBE* & *CDA*...goal △'s △*CBE* & △*CDA*



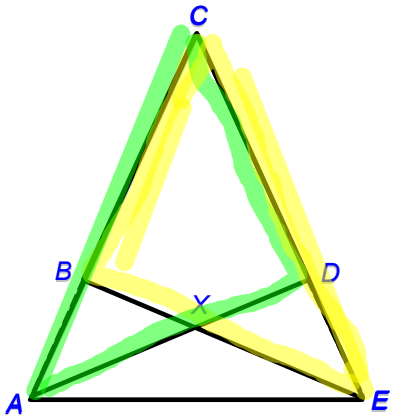
Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

1) Find △'s containing ∠'s *CBE* & *CDA*...goal △'s △*CBE* & △*CDA*

2) Separate, redraw & relabel goal △'s △*CBE* & △*CDA*



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

1) Find △'s containing ∠'s *CBE* & *CDA*...goal △'s △*CBE* & △*CDA*
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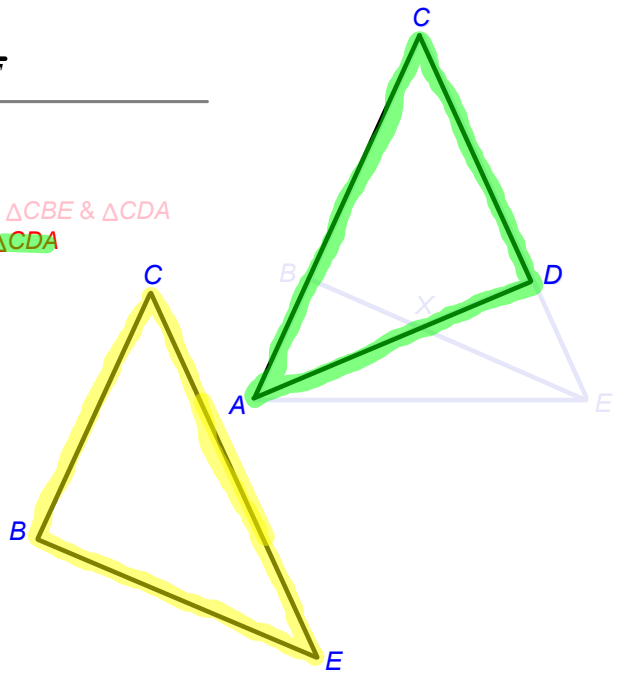

Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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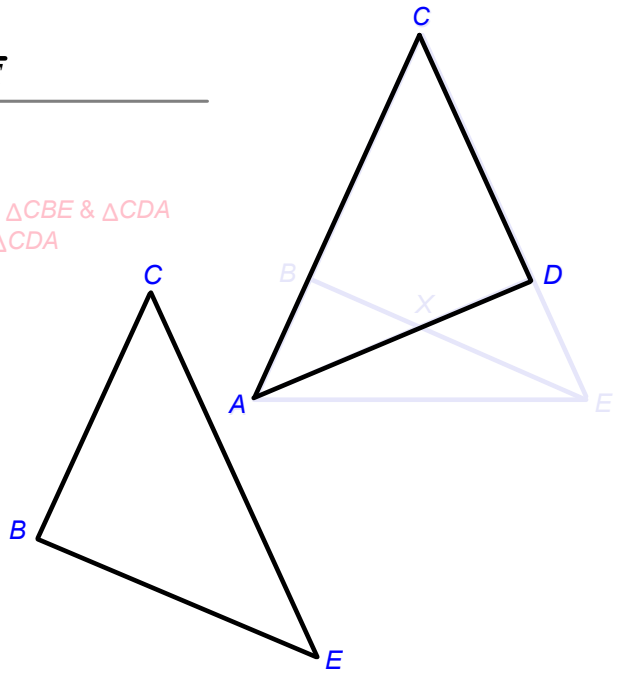
2) Separate, redraw & relabel goal △'s △*CBE* & △*CDA*
3) Identify congruent (given) and common parts



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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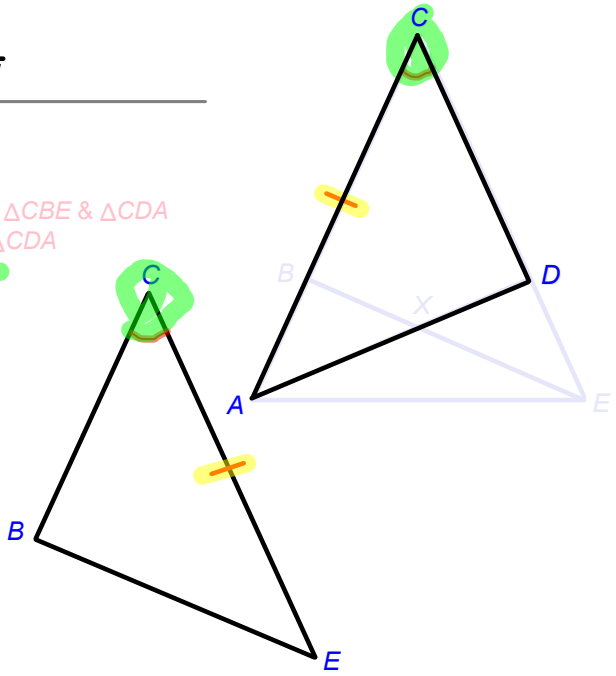

Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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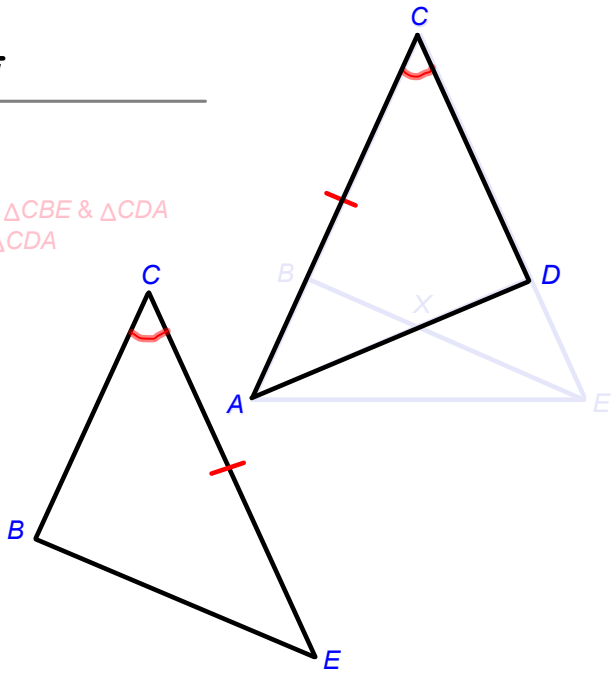
4) Hmm...what about $\overline{BA} \cong \overline{DE}$?



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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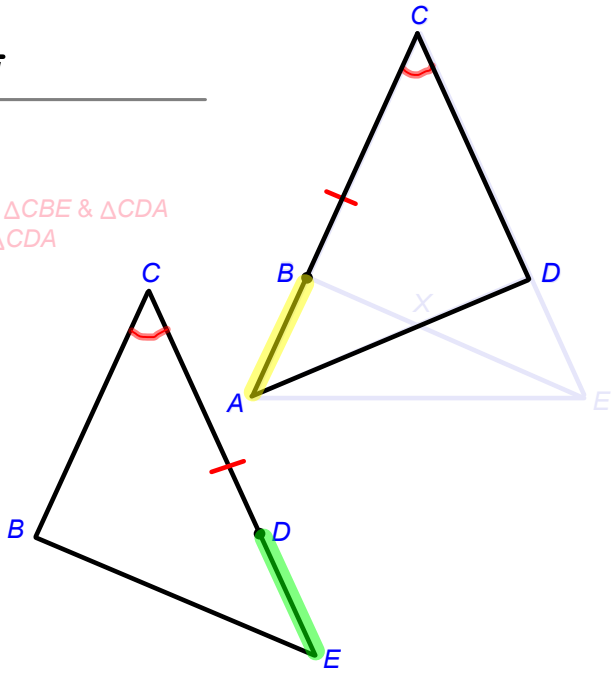
4) Hmm...what about $\overline{BA} \cong \overline{DE}$?
5) Wait! $\overline{BA}$ is part of $\overline{CA}$ and $\overline{DE}$ is part of $\overline{CE}$!



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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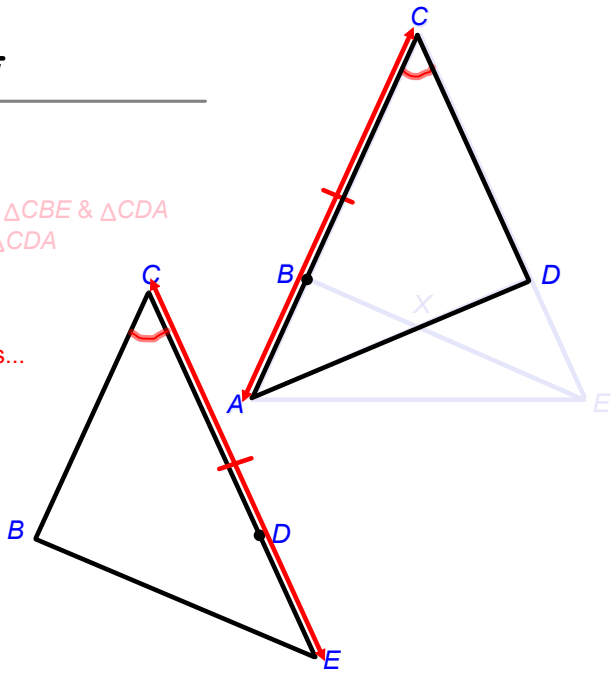
2) Separate, redraw & relabel goal Δ's Δ*CBE* & Δ*CDA*
3) Identify congruent (given) and common parts
4) Hmm...what about $\overline{BA} \cong \overline{DE}$?
5) Wait! $\overline{BA}$ is part of $\overline{CA}$ and $\overline{DE}$ is part of $\overline{CE}$!
6) We can use the Seg Add Post with these parts...
   - *CA = CD + DE & CE = CB + BA*
   - *CA = CE (given)*
   - *CD + DE = CB + BA*
   - *BA = DE (given)*
   - *so CD = CB*



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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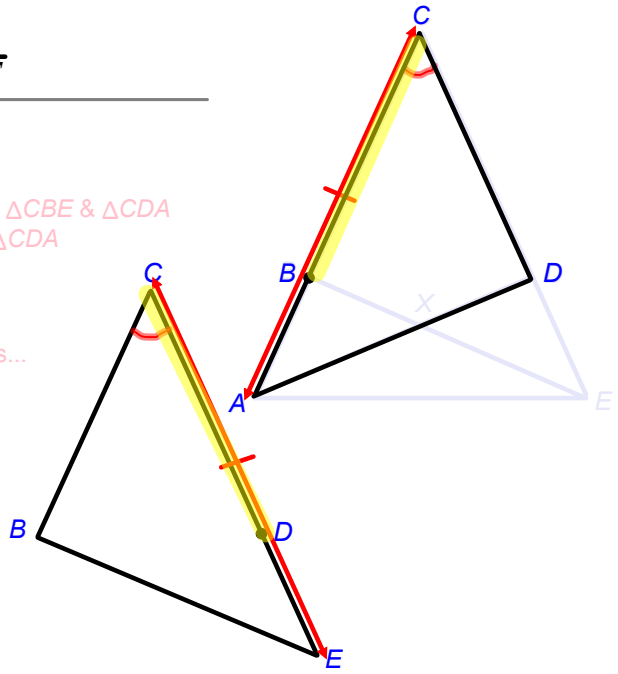
   - *CA = CE (given)*
   - *CD + DE = CB + BA*
   - *BA = DE (given)*
   - *so* $\overline{CD} = \overline{CB}$



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$

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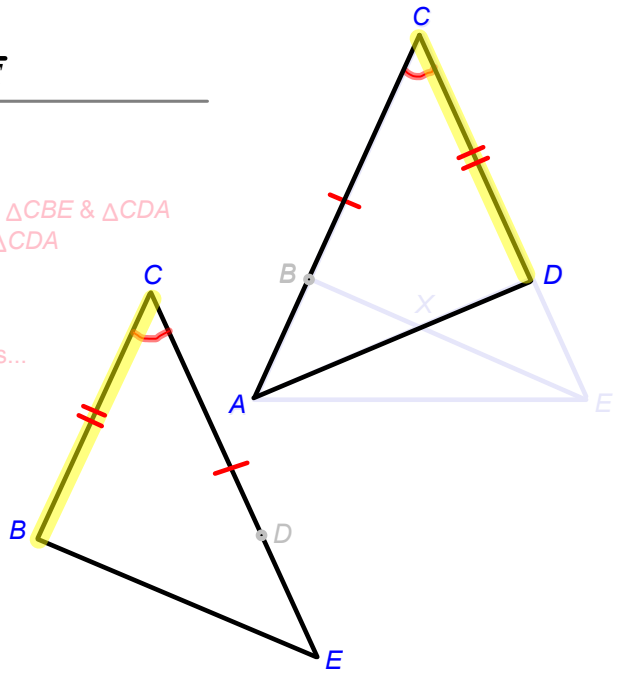
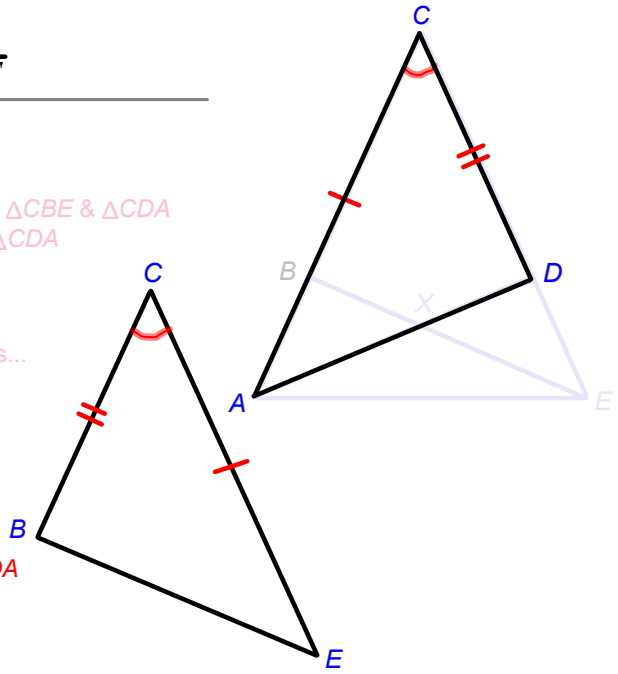
6) We can use the Seg Add Post with these parts...
   - *CA = CD + DE & CE = CB + BA*
   - *CA = CE (given)*
   - *CD + DE = CB + BA*
   - *BA = DE (given)*
   - *so* $\overline{CD} = \overline{CB}$
7) Hey, $\overline{CD}$ is part of the other Δ, so is $\overline{CB}$



Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$



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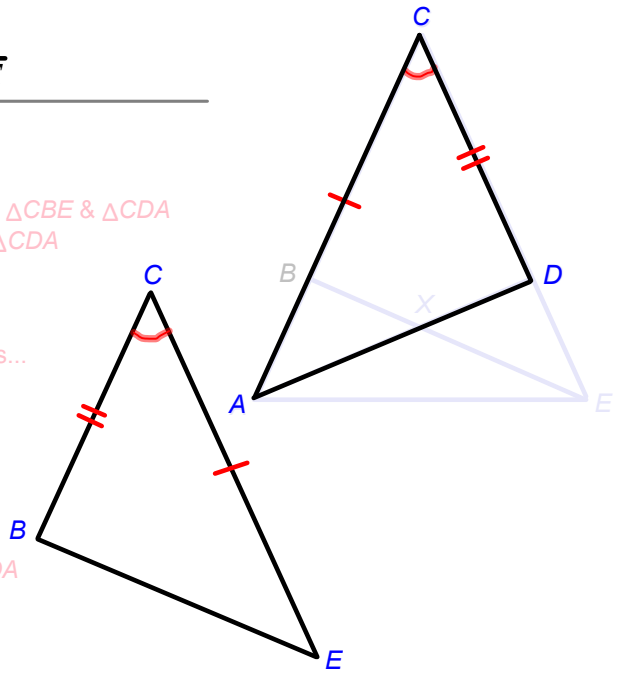
   - *BA = DE (given)*
   - *so CD = CB*
7) Hey, $\overline{CD}$ is part of the other Δ, so is $\overline{CB}$
8) ...and we now have SAS Δ ≅ ... Δ*CBE* ≅ Δ*CDA*

Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$



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   - *CA = CE (given)*
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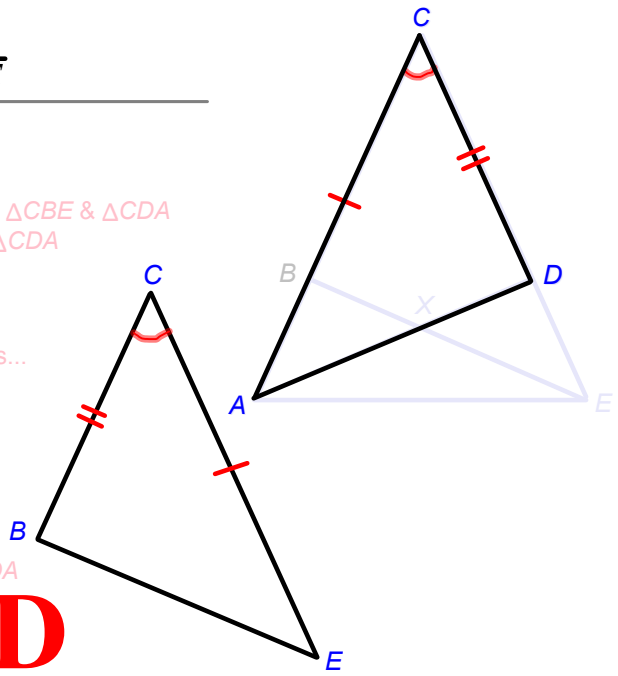
   - *BA = DE (given)*
   - *so CD = CB*
7) Hey, $\overline{CD}$ is part of the other Δ, so is $\overline{CB}$
8) ...and we now have SAS Δ ≅ ... Δ*CBE* ≅ Δ*CDA*
9) ∠*CBE* ≅ ∠*CDA* by CPCTC

Plan and write a proof

Given $\overline{CA} \cong \overline{CE}$ *and* $\overline{BA} \cong \overline{DE}$

Prove $\angle CBE \cong \angle CDA$



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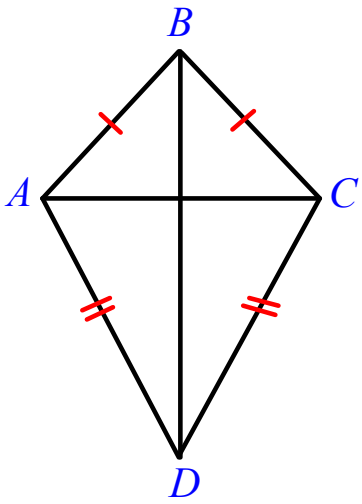
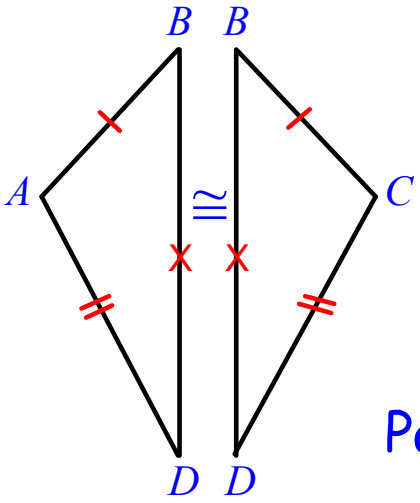
   CA = CE (given)
   CD + DE = CB + BA
   BA = DE (given)
   so CD = CB
7) Hey, $\overline{CD}$ is part of the other Δ, so is $\overline{CB}$
8) ...and we now have SAS Δ ≅ ... Δ*CBE* ≅ Δ*CDA*
9) ∠*CBE* ≅ ∠*CDA* by CPCTC

QED

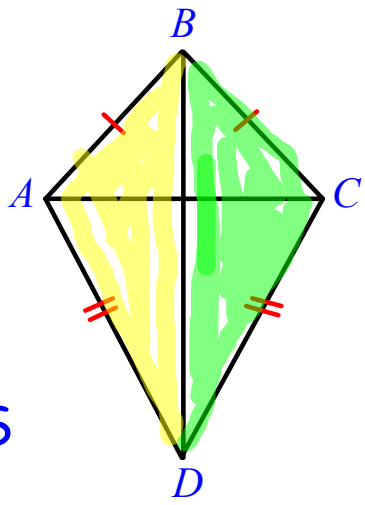
Find all pairs of ≅ Δ's. For each, prove ≅



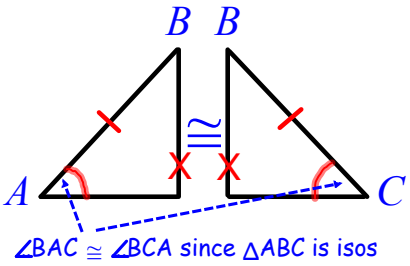
Find all pairs of ≅ Δ's. For each, prove ≅



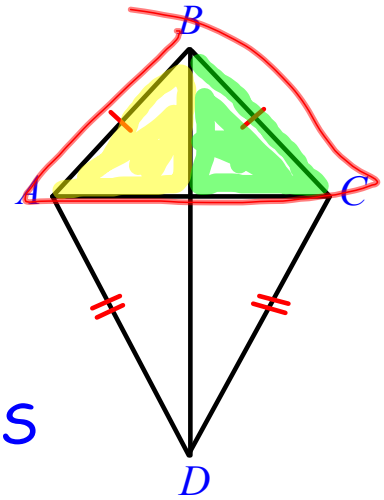
Pair 1 - SSS



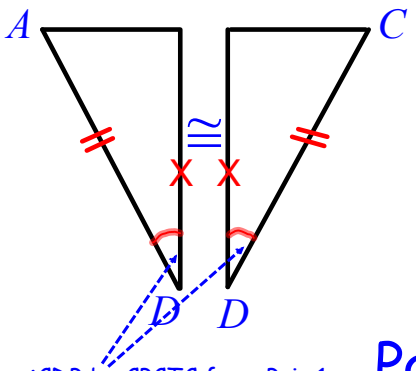
Find all pairs of ≅ Δ's. For each, prove ≅



Pair 2 - SAS



Find all pairs of ≅ Δ's. For each, prove ≅

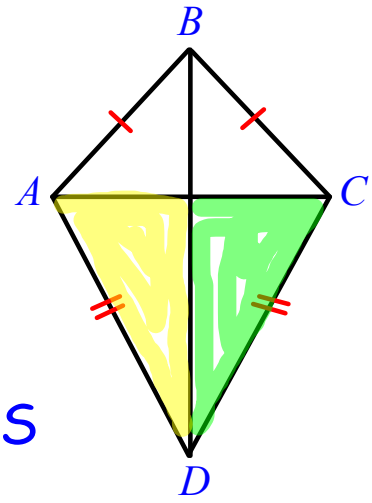


∠ADB ≅ ∠CDB by CPCTC from Pair 1

Pair 3 - SAS

or

Δ ACD is isos & ∠DAC ≅ ∠DCA Isos Δ thm



L4-7 HW Problems

Pg 226 #1-6, 9-14,
23, 24, 28, 34, 36,
38, 43, 45, 47

Pg 232 #1-4