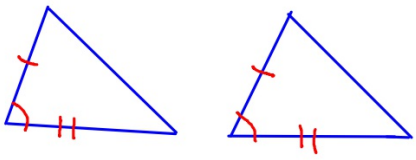
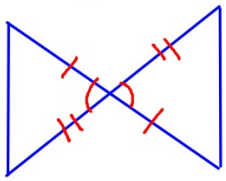
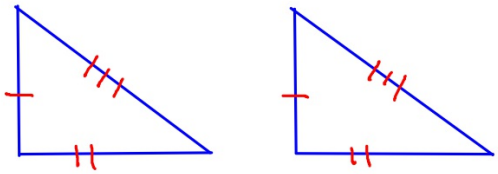
Ways to Prove Triangels Congruent

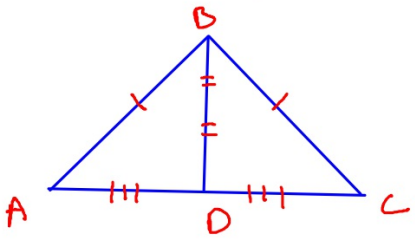
Side Angle Side (SAS) - 2 pairs of corresponding sides $\cong$ and an included angle $\cong$.





Side - Side - Side (SSS) - 3 pairs of corresponding sides $\cong$.

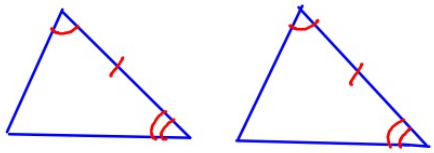


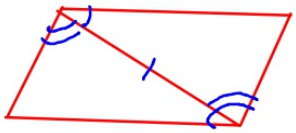


$\triangle ABD \cong \triangle CBD$

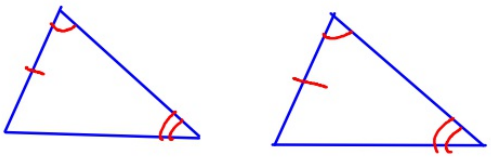
Ways to Prove Triangels Congruent

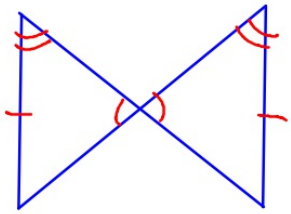
Angle - Side - Angle (ASA) 2 pairs of corresponding angles ≅ and an included side ≅.





Angle - Angle - Side (AAS) 2 pairs of corresponding Angles ≅ and any non-included side ≅.





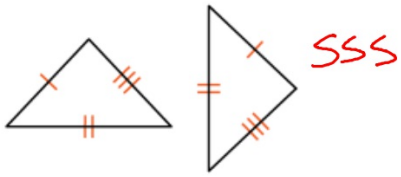
△ ≅

SSS
SAS
ASA
AAS

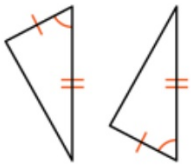
No △ ≅

AA
ASS / SSA

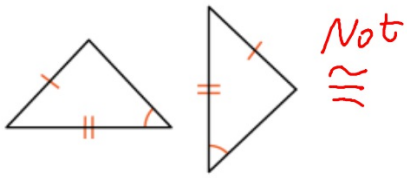
A. Which of the following pairs are congruent by SAS or SSS?



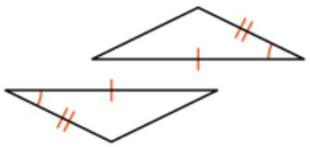
SSS



SAS

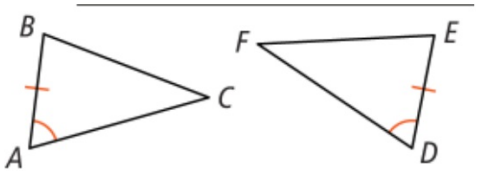


Not $\cong$



SAS

B. What additional information is needed to show $\triangle ABC \cong \triangle DEF$ by SAS? By SSS?



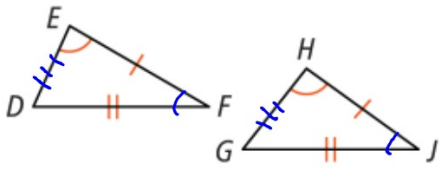
SAS $\overline{AC} \cong \overline{DF}$

SSS $\overline{AC} \cong \overline{DF}$

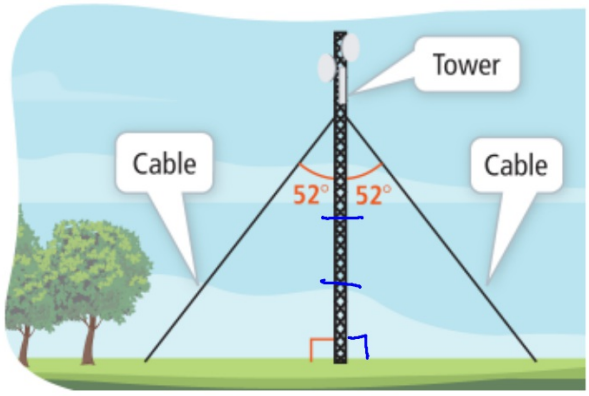
$\overline{BC} \cong \overline{EF}$

Try It!

4. b. Is any additional information needed to show $\triangle DEF \cong \triangle GHJ$ by SAS? Explain.



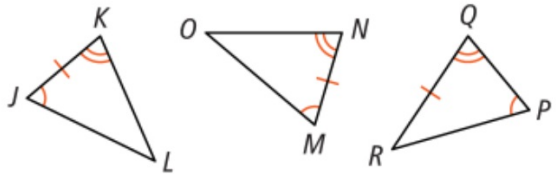
A technician installs cables from a cell phone tower to the ground. To pass inspection, both cables must be the same length. Does this installation meet the cable-length requirement? Explain.



SOLUTION

Yes / 10 — No / ∅ — ? / 4

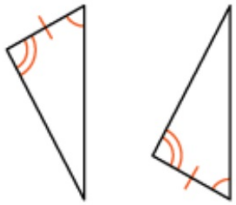
3. a. Are $\triangle JKL$ and $\triangle MNO$ congruent? Explain.



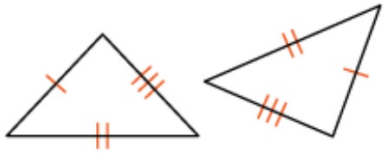
b. Are $\triangle JKL$ and $\triangle PQR$ congruent? Explain.

A. State whether each pair of triangles is congruent by SAS, SSS, ASA, or AAS, or if the congruence cannot be determined.

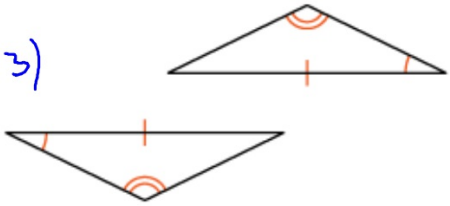
1)



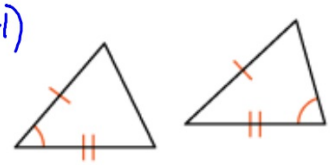
2)



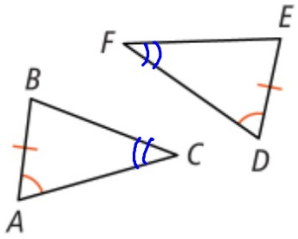
3)



4)



5. a. What additional information is needed to show $\triangle ABC \cong \triangle DEF$ by ASA?



Enter your answer.

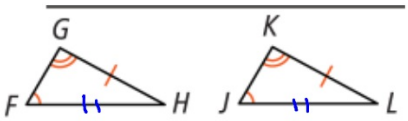
CHECK ANSWER

b. What additional information is needed to show $\triangle ABC \cong \triangle DEF$ by AAS?

Corresponding Parts of Congruent Triangles are Congruent

CPCTC

B. Prove that $\overline{FH} \cong \overline{JL}$.



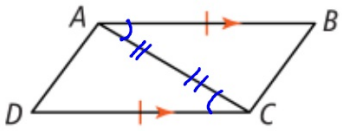
Given: $\overline{GH} \cong \overline{KL}$, $\angle GFH \cong \angle KJL$, and $\angle FGH \cong \angle JKL$

Prove: $\overline{FH} \cong \overline{JL}$

Statement	Reason
1) $\overline{GH} \cong \overline{KL}$, $\angle GFH \cong \angle KJL$ and $\angle FGH \cong \angle JKL$	1) Given
2) $\triangle FGH \cong \triangle JKL$	2) AAS
3) $\overline{FH} \cong \overline{JL}$	3) CPCTC

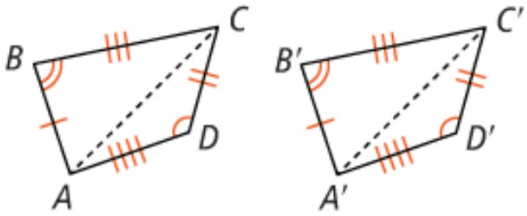
Try It!

2. Given that $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$, how can you show that $\angle B \cong \angle D$?



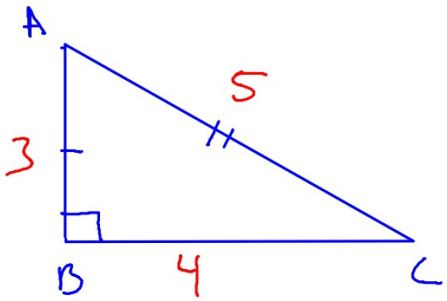
Statement	Reason
1) $\overline{AB} \parallel \overline{CD}$ $\overline{AB} \cong \overline{CD}$	1) Given
2) $\overline{AC} \cong \overline{AC}$	2) Reflexive prop.
3) $\angle BAC \cong \angle DCA$	3) Alternate Interior $\angle$'s $\cong$
4) $\triangle BAC \cong \triangle DCA$	4) SAS
5) $\angle B \cong \angle D$	5) CPCTC

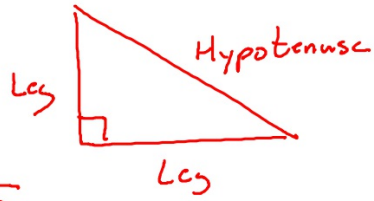
All sides and angles of $ABCD$ are congruent to the corresponding sides and angles of $A'B'C'D'$. Is $ABCD$ congruent to $A'B'C'D'$?

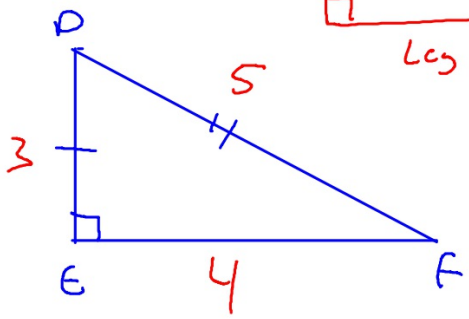


Right △

Hypotenuse Leg

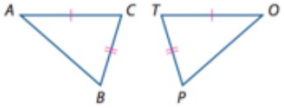




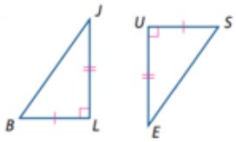


Examine each of the following pairs of triangles and their markings showing congruence of corresponding angles and sides. In each case, decide whether the information given by the markings ensures that the triangles are congruent. If the triangles are congruent, write a congruence relation showing the correspondence between vertices. Cite an appropriate congruence theorem to support your conclusion.

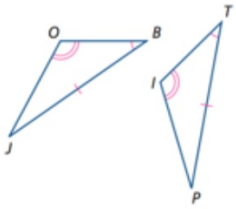
a.



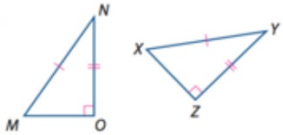
b.



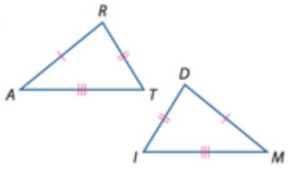
c.



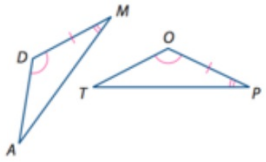
d.



e.



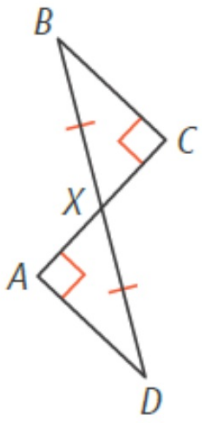
f.



Write a proof. SEE EXAMPLE 5

Given: $\angle A \cong \angle C$, $\overline{BX} \cong \overline{DX}$

Prove: $\overline{AX} \cong \overline{CX}$



Given: $\overline{CB} \cong \overline{CD}, \angle B \cong \angle D, \angle BAC \cong \angle DEC$

Prove: $\angle CAE \cong \angle CEA$