

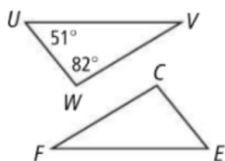
Bell Ringer

Section 10.1 – Congruent Triangles

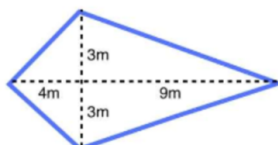
1. $\triangle FAR \cong \triangle HIT$ List all corresponding angles and corresponding sides.

2. Complete the statements, **Given:** $MATH \cong BEST$ $MH \cong$ _____ $ATHM \cong$ _____ $\angle A \cong \angle$ _____
Given: $MATH \cong BEST$

3. If $\triangle UVW \cong \triangle EFC$, what is the measure of $\angle FEC$?



4. Find the area of the kite.



Solutions

Section 10.1 – Congruent Triangles

1. $\triangle FAR \cong \triangle HIT$ List all corresponding angles and corresponding sides.

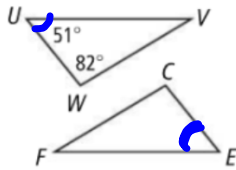
$\overline{FA} \cong \overline{HI}, \overline{AR} \cong \overline{IT}, \overline{RF} \cong \overline{TH} \quad \angle F \cong \angle H, \angle A \cong \angle I, \angle R \cong \angle T$

2. Complete the statements, **Given:** $MATH \cong BEST$ $MH \cong BT$ $ATHM \cong ESTB$ $\angle A \cong \angle E$

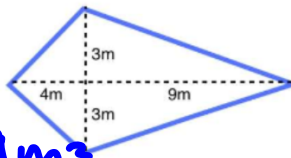
Given: $MATH \cong BEST$

3. If $\triangle UVW \cong \triangle FEC$, what is the measure of $\angle FEC$?

$m\angle FEC = 51^\circ$



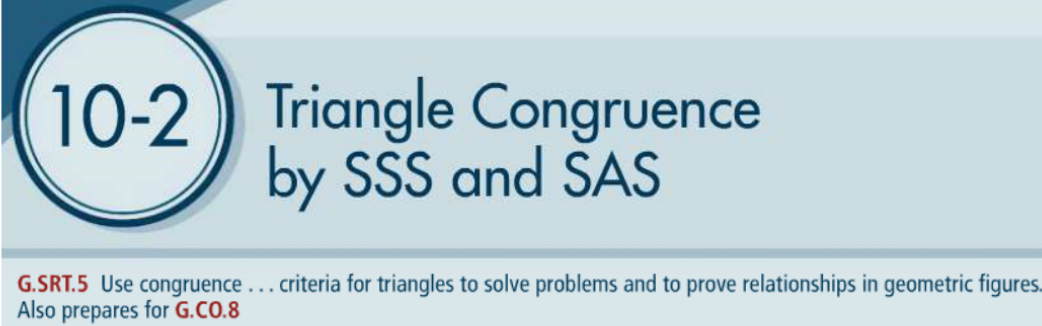
4. Find the area of the kite.



$A = 54m^2$

$\frac{6 \cdot 13}{2} = 3 \cdot 13 = 39m^2$

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10-2 Triangle Congruence
by SSS and SAS

G.SRT.5 Use congruence . . . criteria for triangles to solve problems and to prove relationships in geometric figures.
Also prepares for **G.CO.8**

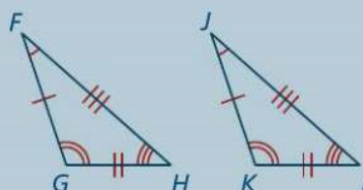
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In the Solve It, you looked for relationships between corresponding sides and angles. In Lesson 10-1, you learned that if two triangles have three pairs of congruent corresponding angles and three pairs of congruent corresponding sides, then the triangles are congruent.

If you know . . .

$$\begin{array}{l} \angle F \cong \angle J \quad \overline{FG} \cong \overline{JK} \\ \angle G \cong \angle K \quad \overline{GH} \cong \overline{KL} \\ \angle H \cong \angle L \quad \overline{FH} \cong \overline{JL} \end{array}$$



. . . then you know $\triangle FGH \cong \triangle JKL$.

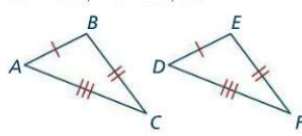
However, this is more information about the corresponding parts than you need to prove triangles congruent.

Essential Understanding You can prove that two triangles are congruent without having to show that *all* corresponding parts are congruent. In this lesson, you will prove triangles congruent by using (1) three pairs of corresponding sides and (2) two pairs of corresponding sides and one pair of corresponding angles.

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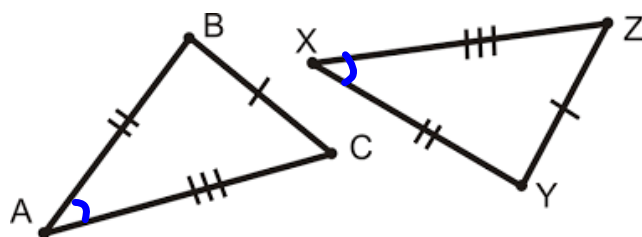
Take note **Postulate 3 Side-Side-Side (SSS) Postulate** **SSS**

<p>Postulate</p> <p>If the three sides of one triangle are congruent to the three sides of another triangle, then the two triangles are congruent.</p>	<p>If ...</p> $\overline{AB} \cong \overline{DE}, \overline{BC} \cong \overline{EF}, \overline{AC} \cong \overline{DF}$ 	<p>Then ...</p> $\triangle ABC \cong \triangle DEF$
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A postulate is an accepted statement of fact. The Side-Side-Side Postulate is perhaps the most logical fact about triangles. It agrees with the notion that triangles are rigid figures; their shape does not change until pressure on their sides forces them to break. This rigidity property is important to architects and engineers when they build things such as bicycle frames and steel bridges.

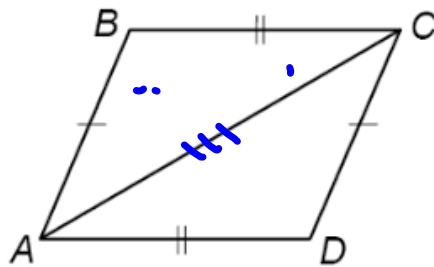
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Are the triangles congruent?



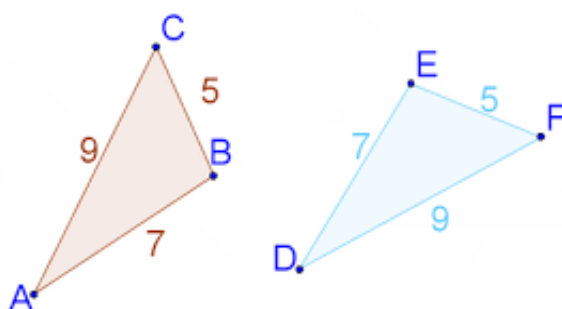
$\triangle ABC \cong \triangle XYZ$ by SSS

Are the triangles congruent?



$\triangle ABC \cong \triangle CDA$ by SSS

Are the triangles congruent?



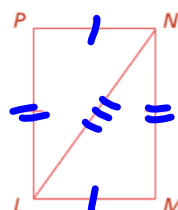
$\triangle ABC \cong \triangle DEF$ by SSS

not in book



ONLINE PROBLEMS Problem 1 Using SSS

Proof Given: $\overline{LM} \cong \overline{NP}$, $\overline{LP} \cong \overline{NM}$
 Prove: $\triangle LMN \cong \triangle NPL$

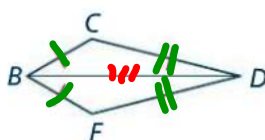


Statement	Reason
$\overline{LM} \cong \overline{NP}$	Given
$\overline{LP} \cong \overline{NM}$	Given
$\overline{LN} \cong \overline{NL}$	Reflexive Prop
$\triangle LMN \cong \triangle NPL$	SSS

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Got It? Given: $\overline{BC} \cong \overline{BF}$, $\overline{CD} \cong \overline{FD}$

Prove: $\triangle BCD \cong \triangle BFD$



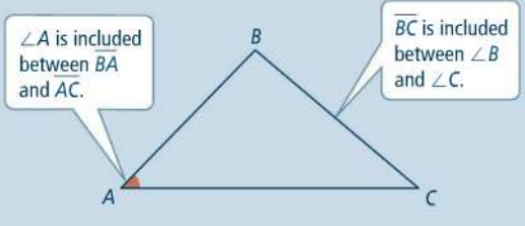
Statement	Reason
$\overline{BC} \cong \overline{BF}$	Given
$\overline{CD} \cong \overline{FD}$	Given
$\overline{BD} \cong \overline{BD}$	Reflexive Prop
$\triangle BCD \cong \triangle BFD$	SSS

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You can also show relationships between a pair of corresponding sides and an *included* angle.

The word *included* refers to the angles and the sides of a triangle, as shown at the right.



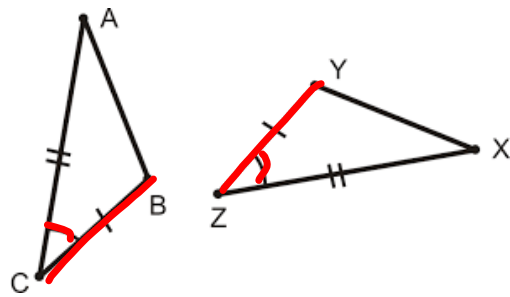
Take note **Postulate 4 Side-Angle-Side (SAS) Postulate**

Postulate	If . . .	Then . . .
If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent.	$\overline{AB} \cong \overline{DE}, \angle A \cong \angle D,$ $\overline{AC} \cong \overline{DF}$	$\triangle ABC \cong \triangle DEF$

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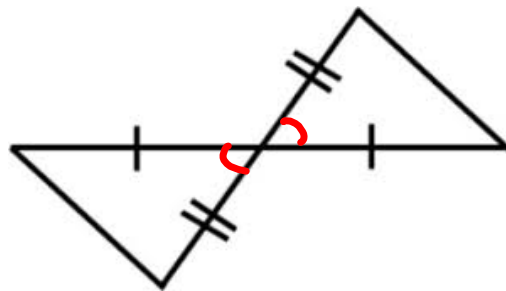
 Video - first three minutes

Are the triangles congruent?

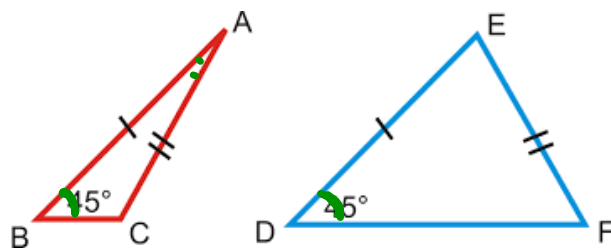


$\triangle ABC \cong \triangle XYZ$ by SAS

Are the triangles congruent?

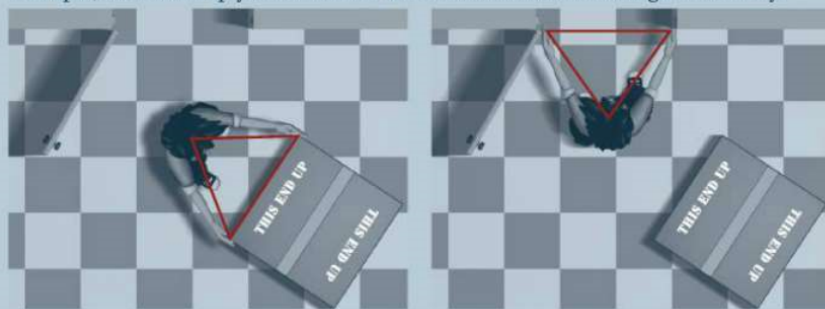


Are the triangles congruent?



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You likely have used the properties of the Side-Angle-Side Postulate before. For example, SAS can help you determine whether a box will fit through a doorway.



Suppose you keep your arms at a fixed angle as you move from the box to the doorway. The triangle you form with the box is congruent to the triangle you form with the doorway. The two triangles are congruent because two sides and the included angle of one triangle are congruent to the two sides and the included angle of the other triangle.

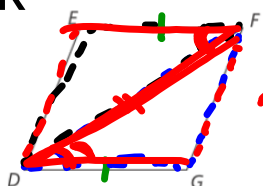
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not in book



Problem 2

Using SAS

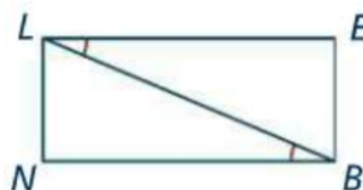
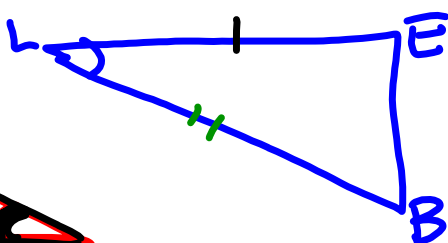
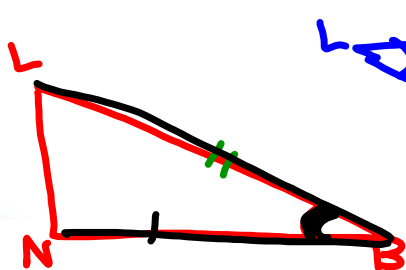


What other information do you need to prove $\triangle DEF \cong \triangle FGD$ by SAS?
Explain.



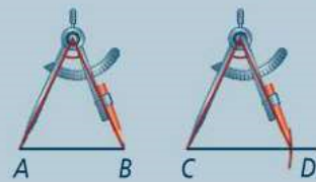
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Got It? What other information do you need to prove $\triangle LEB \cong \triangle BNL$ by SAS?



$$\overline{NB} \cong \overline{EL}$$

Recall that, in Lesson 7-1, you learned to construct segments using a compass open to a fixed angle. Now you can show that it works. Similar to the situation with the box and the doorway, the Side-Angle-Side Postulate tells you that the triangles outlined at the right are congruent. So, $\overline{AB} \cong \overline{CD}$.



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not in book

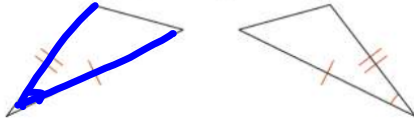


Problem 3

Identifying Congruent Triangles

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write *not enough information*. Explain your answer.

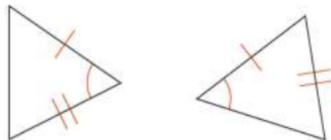
A



SAS

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write *not enough information*. Explain your answer.

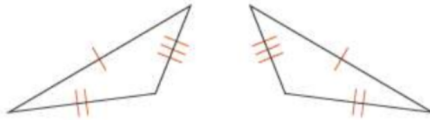
B



not enough info

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write *not enough information*. Explain your answer.

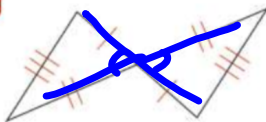
C



SSS

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write *not enough information*. Explain your answer.

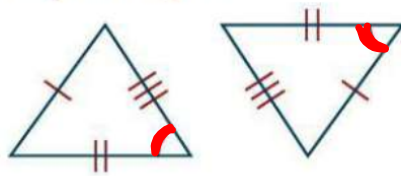
D



SSS
or
SAS

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Got It? Would you use SSS or SAS to prove the triangles below congruent? Explain.



SSS

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hw 10.2 #s 1-14, 23-27, skip #26

