Key

Math 1

Name _____

Date_____

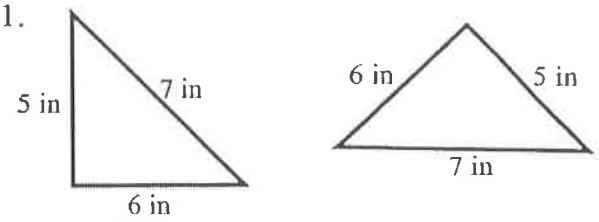
6-6 Congruent Triangles

Learning Goals:

- *I can use theorems, postulates, or definitions to prove theorems about triangles.*

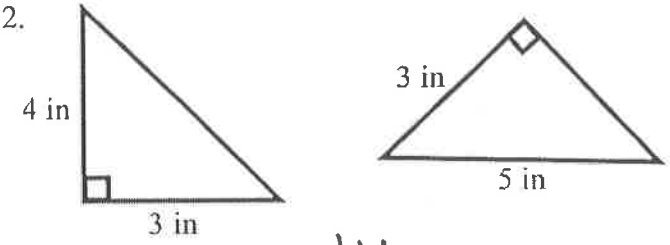
Determine whether or not the following triangles are identical and explain how you know.

1.



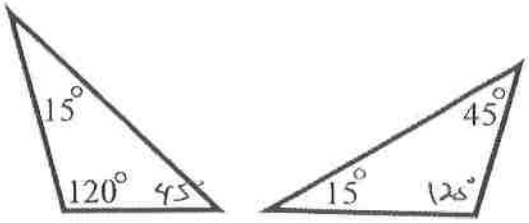
Yes. SSS

2.



Yes. ~~SAS~~ HL

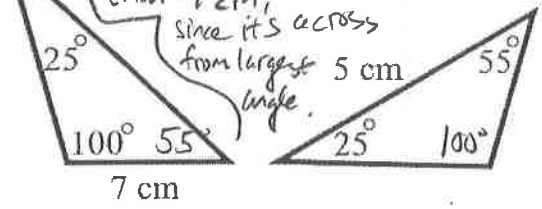
3.



Not enough information.

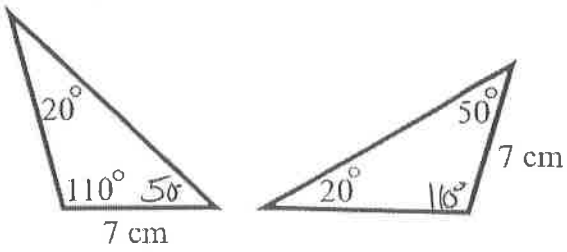
4.

This side has to be larger than 7 cm, since it's across from largest angle.



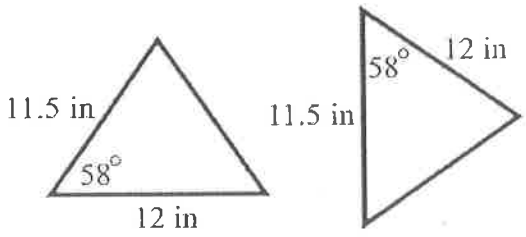
Not congruent.

5.



Yes. ASA or AAS

6.



Yes. SAS

Similar Symbol	+	Equal Symbol	=	Congruent Symbol
$\sim$		$=$		$\cong$
which means same shape		which means same size		which means… Same shape & size

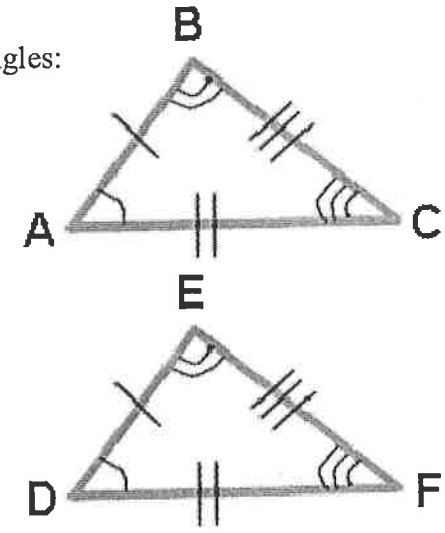
EXAMPLE:

The 6 facts for our congruent triangles:

$\overline{AB} \cong \overline{DE}$ $\quad \angle A \cong \angle D$

$\overline{BC} \cong \overline{EF}$ $\quad \angle B \cong \angle E$

$\overline{AC} \cong \overline{DF}$ $\quad \angle C \cong \angle F$



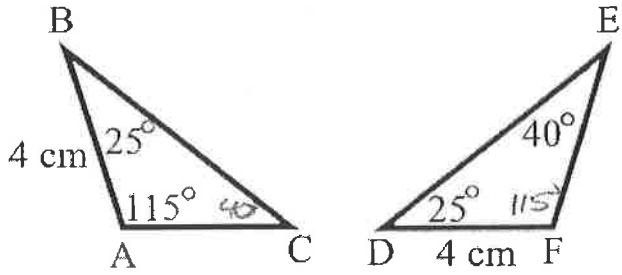
$\Delta ABC \cong \Delta DEF$

NOTE:

The corresponding congruent sides are marked with small straight line segments called hash marks. The corresponding congruent angles are marked with arcs.

The triangles to the right are congruent. Answer the following:

7. $\overline{AB} \cong$ $\overline{DF}$ or $\overline{FD}$
8. $\angle C \cong$ $\angle E$
9. $\overline{BC} \cong$ $\overline{DE}$
10. $\angle BAC \cong$ $\angle DFE$
11. $\Delta ABC \cong$ ~~$\angle EDF$~~ ΔFDE



Six facts for every set of congruent triangles!

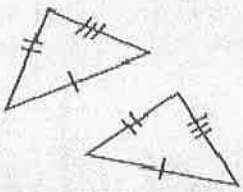
There are certain combinations of the facts that are sufficient to prove that triangles are congruent.

3 pairs of $\cong$ angles

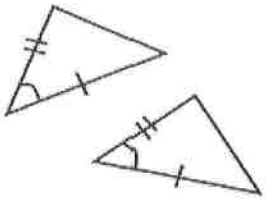
3 pairs of $\cong$ sides

Methods for Proving (Showing) Triangles to be Congruent

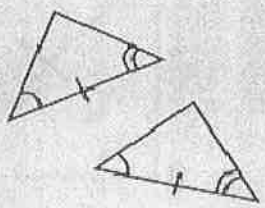
SSS If three sides of one triangle are congruent to three sides of another triangle, the triangles are congruent.
(For this method, the sum of the lengths of any two sides must be greater than the length of the third side, to guarantee a triangle exists.)



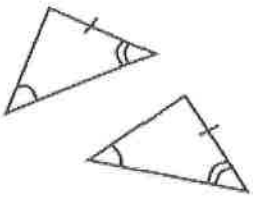
SAS If two sides and the included angle of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. (The included angle is the angle formed by the sides being used.)



ASA If two angles and the included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. (The included side is the side between the angles being used. It is the side where the rays of the angles would overlap.)

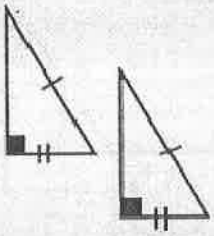


AAS If two angles and the non-included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent. (The non-included side can be either of the two sides that are not between the two angles being used.)



HL
Right Triangles Only

If the hypotenuse and leg of one right triangle are congruent to the corresponding parts of another right triangle, the right triangles are congruent. (Either leg of the right triangle may be used as long as the corresponding legs are used.)

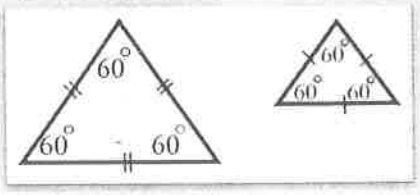


Methods that DO NOT Prove Triangles to be Congruent

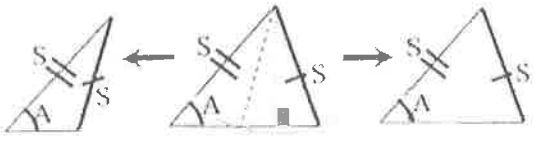
AAA **AAA** works fine to show that triangles are the same SHAPE (similar), but does **NOT** work to also show they are the same size, thus congruent!

Consider the example at the right.

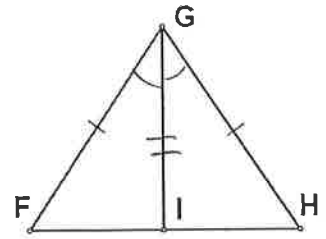
You can easily draw 2 equilateral triangles that are the same shape but are **not** congruent (the same size).



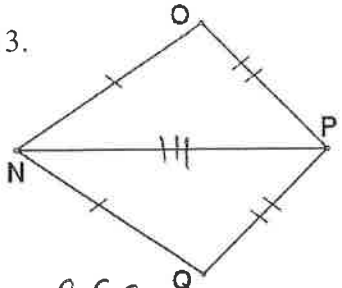
SSA This is **NOT** a universal method to prove triangles congruent because it cannot guarantee that one unique triangle will be drawn!!



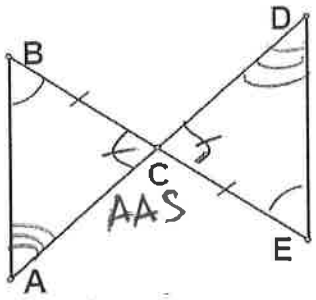
For each pair of triangles, state the theorem that can be used to conclude that the triangles are congr. If the triangles are not congruent, cross them out.

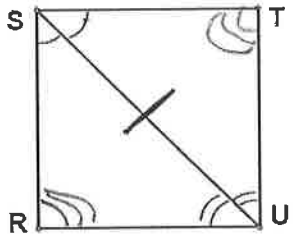
12. 

SAS

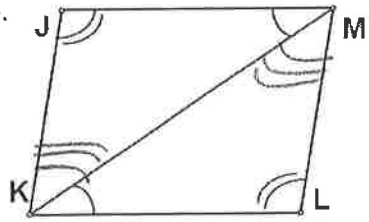
13. 

SSS

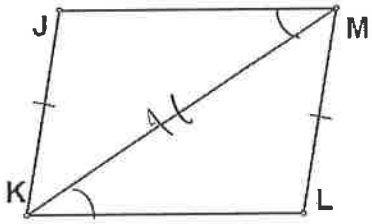
14. 

15. 

ASA

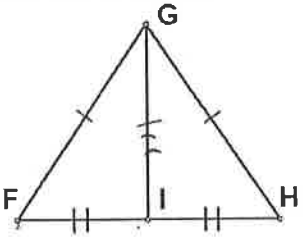
16. 

Not enough information

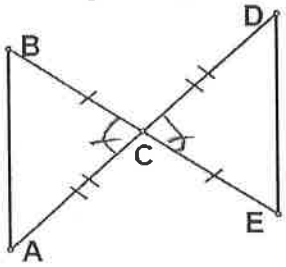
17. 

Not enough info.

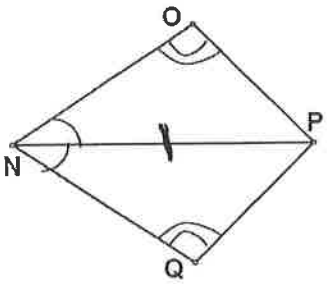
For each set of triangles above, complete the triangle congruence statement.

18. 

$\Delta FIG \cong \Delta$ HIG

19. 

$\Delta CAB \cong \Delta$ CDE

20. 

$\Delta NOP \cong \Delta$ NQP

21. What theorem can be used to justify that the triangles in 18, are congruent?

SSS

22. What theorem can be used to justify that the triangles in 19, are congruent?

SAS

23. What theorem can be used to justify that the triangles in 20, are congruent?

AAS or ASA