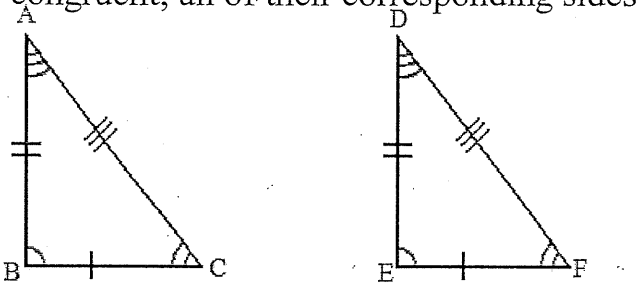
CCGPS Analytic Geometry – Triangle Congruence Notes Day 1 September 15, 2014 (Mon)
Homework: Worksheet

Essential Question: What are the similarities and differences between the five congruence postulates and theorems?

In order for 2 triangles to be congruent, all of their corresponding sides and angles must be congruent.



It would very time consuming to prove all 6 of these parts are congruent each time so there are some shortcuts we can use. Over the next few days, let's figure out what shortcuts work and also which ones do not!
When working with 3 measurements (angles, or sides, or a combination of the two), there are 6 possible arrangements:

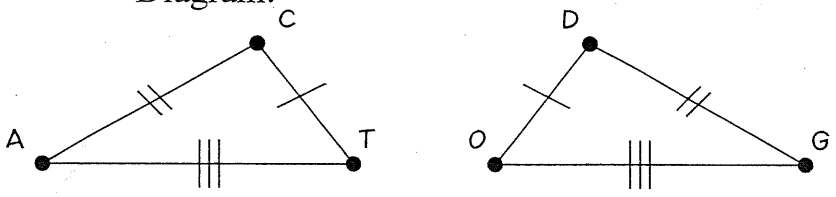
Side-Side-Side **Side-Angle-Side** **Side-Side-Angle**

Angle-Side-Angle **Angle-Angle-Side** **Angle-Angle-Angle**

Two of these arrangements of congruent corresponding parts will not guarantee that triangles are congruent: _____ and _____. The other four arrangements of measurements and a special theorem for right triangles *will* guarantee that triangles are congruent.

Side-Side-Side Congruence Postulate (SSS ≅ Postulate): If _____ sides of one triangle are congruent with three _____ of another triangle, then the triangles are _____.

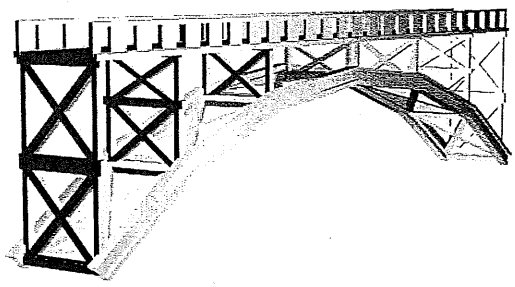
Diagram:



Congruence Statement:

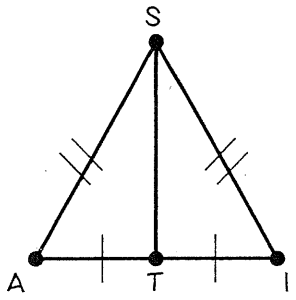
_____

The SSS ≅ Postulate shows why triangles are used when constructing buildings, bridges, and even bookshelves. Three given side lengths **cannot** create more than one possible triangular shape. So, when a structure is composed of triangles, it **cannot** change its shape. For this reason, a triangle is known as a ***rigid shape***.

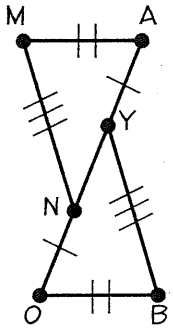


Examples: Determine whether the congruence statement is true based on the given figure. *Explain* your reasoning.

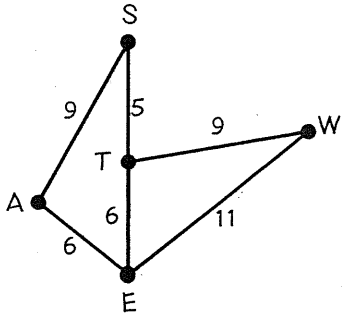
a. $\triangle SAT \cong \triangle SIT$



b. $\triangle MAN \cong \triangle BOY$



c. $\triangle\triangle SEA \cong \triangle\triangle WET$



Now that we have determined that SSS $\cong$ Postulate is a shortcut to triangle congruence will AAA also work? Can you think of a counterexample that would prove that AAA is not a shortcut for proving triangle congruence.
Hint: A picture could be a counterexample.

Name _____ Date _____ Period _____

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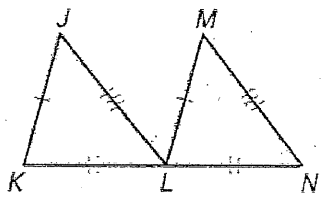
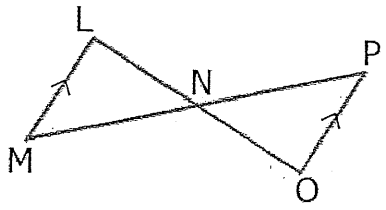
Determine if the triangles are congruent. If they are (1) state the postulate used and (2) write a congruence statement. If not, explain why.

1.



2.



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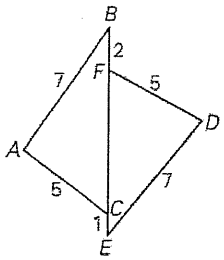

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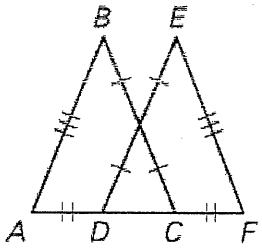

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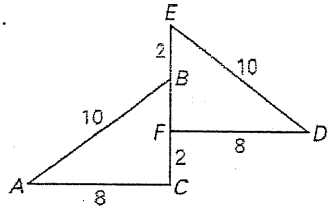
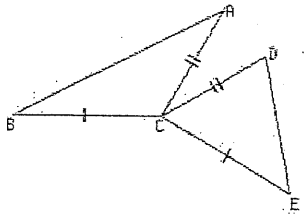
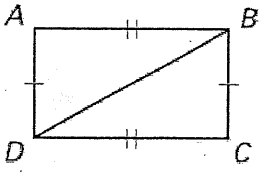


6.

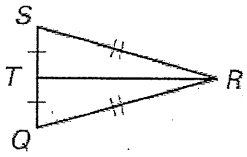


Determine if the given congruence statement is correct. If it is not, correct it.

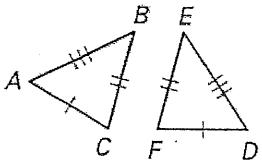
7. $\triangle ABD \cong \triangle CDB$



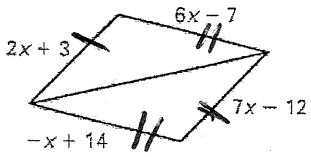
8. $\triangle RST \cong \triangle RQT$



9. $\triangle ABC \cong \triangle DEF$



10. Determine all values of x that would make the 2 triangles congruent. Explain.



11. Mrs. Gibbons is making a sandwich for her two twin girls. She uses 2 rectangular pieces of bread to make one sandwich and then cuts along the diagonal. Are the two triangular sandwiches congruent? Explain.

LESSON 4.3

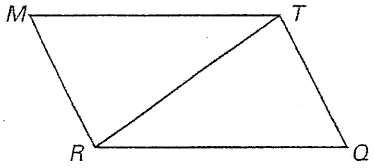
NAME _____ DATE _____

Practice A

For use with pages 212–219

Use the diagram. Name the included angle between the pair of sides given.

1. $\overline{MT}$ and $\overline{TR}$
2. $\overline{TQ}$ and $\overline{RT}$
3. $\overline{RT}$ and $\overline{MR}$
4. $\overline{TQ}$ and $\overline{RQ}$
5. $\overline{MR}$ and $\overline{TM}$
6. $\overline{RT}$ and $\overline{QR}$

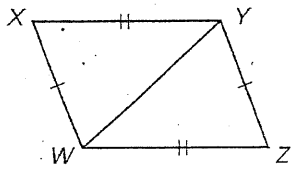


For each pair of congruent triangles, name the pairs of corresponding sides.

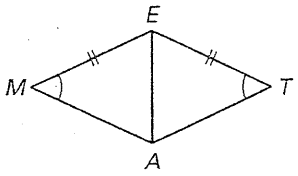
7. $\triangle ABC \cong \triangle TDF$
8. $\triangle DCT \cong \triangle FLG$
9. $\triangle PWR \cong \triangle ADE$

Decide whether enough information is given to prove that the triangles are congruent. If there is enough information, state the congruence postulate you would use.

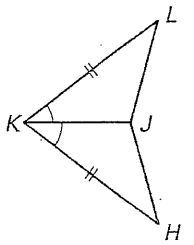
10. $\triangle XYW$, $\triangle ZWY$



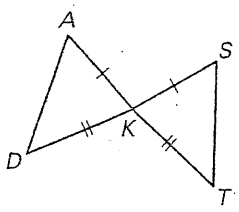
11. $\triangle MAE$, $\triangle TAE$



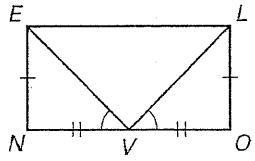
12. $\triangle KHJ$, $\triangle JLK$



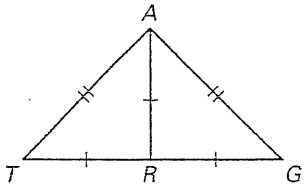
13. $\triangle DKA$, $\triangle TKS$



14. $\triangle ENV$, $\triangle LOV$

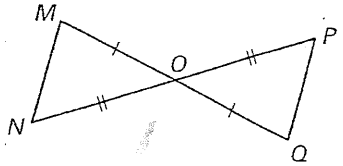


15. $\triangle TRA$, $\triangle ARG$



Complete the proof by supplying the reasons.

16. **Given:** O is the midpoint of $\overline{MQ}$.
O is the midpoint of $\overline{NP}$.
Prove: $\triangle MON \cong \triangle QOP$



Statements	Reasons
1. O is the midpoint of $\overline{MQ}$.	1. ?
2. $\overline{MO} \cong \overline{QO}$	2. ?
3. O is the midpoint of $\overline{NP}$.	3. ?
4. $\overline{NO} \cong \overline{PO}$	4. ?
5. $\angle MON \cong \angle QOP$	5. ?
6. $\triangle MON \cong \triangle QOP$	6. ?

Lesson 4.3

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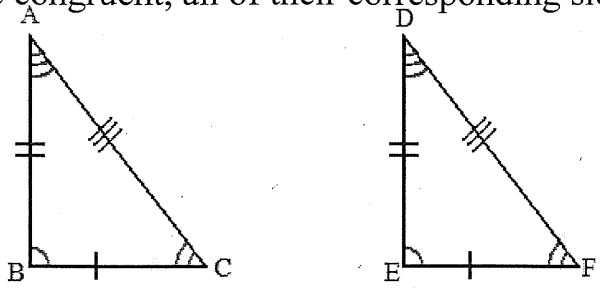

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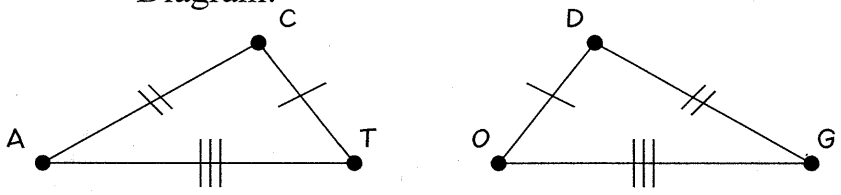
Two of these arrangements of congruent corresponding parts will not guarantee that triangles are congruent: _____ and _____. The other four arrangements of measurements and a special theorem for right triangles *will* guarantee that triangles are congruent.

Side-Side-Side Congruence Postulate (SSS ≅ Postulate): If 3 sides of one triangle are congruent with three sides of another triangle, then the triangles are congruent.

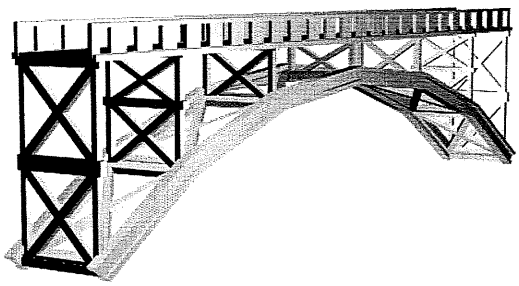
Diagram:



Congruence Statement:

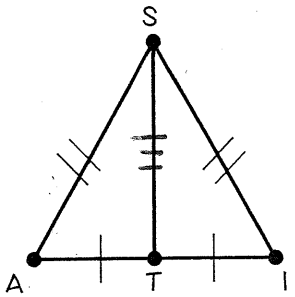
$\triangle ACT \cong \triangle GDO$

The SSS ≅ Postulate shows why triangles are used when constructing buildings, bridges, and even bookshelves. Three given side lengths **cannot** create more than one possible triangular shape. So, when a structure is composed of triangles, it **cannot** change its shape. For this reason, a triangle is known as a ***rigid shape***.



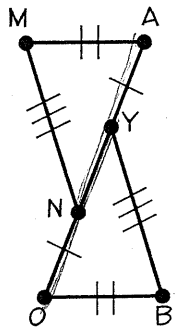
Examples: Determine whether the congruence statement is true based on the given figure. *Explain* your reasoning.

a. $\triangle SAT \cong \triangle SIT$ b. $\triangle MAN \cong \triangle BOY$ c. $\triangle SEA \cong \triangle WET$



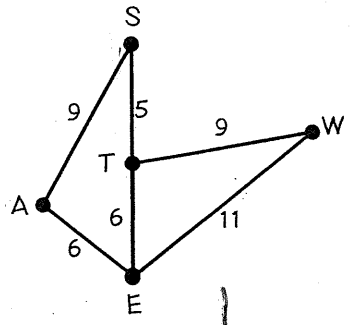
$\overline{AT} \cong \overline{TI}$
$\overline{AS} \cong \overline{IS}$
$\overline{TS} \cong \overline{TS}$

By SSS
$\triangle SAT \cong \triangle SIT$



$\overline{MA} \cong \overline{BO}$
$\overline{AN} \cong \overline{OY}$
$\overline{MN} \cong \overline{BY}$

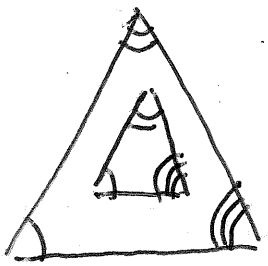
By SSS
$\triangle MAN \cong \triangle BOY$



$SE = 11$ $WE = 11$
$EA = 6$ $ET = 6$
$AS = 9$ $TW = 9$

By SSS
$\triangle SEA \cong \triangle WET$

Now that we have determined that SSS ≅ Postulate is a shortcut to triangle congruence will AAA also work? Can you think of a counterexample that would prove that AAA is not a shortcut for proving triangle congruence.
Hint: A picture could be a counterexample.



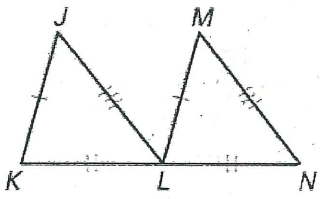
AAA is not shortcut for proving triangle congruence

Name _____ Date _____ Period _____

CCGPS Analytic Geometry - September 15, 2014
Day 1: Triangle Congruence Homework

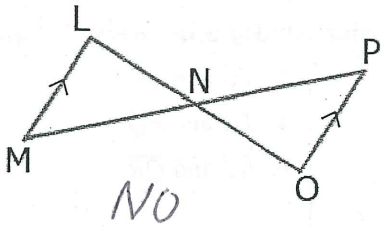
Determine if the triangles are congruent. If they are (1) state the postulate used and (2) write a congruence statement. If not, explain why.

1.



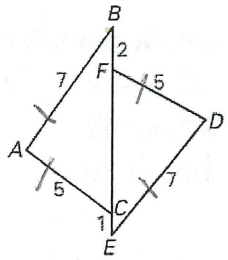
SSS $\triangle JKL \cong \triangle MLN$

2.



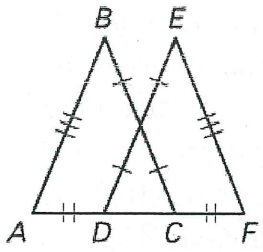
NO

3.



NO

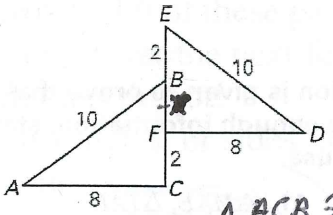
4.



SSS

$\triangle ABC \cong \triangle FED$

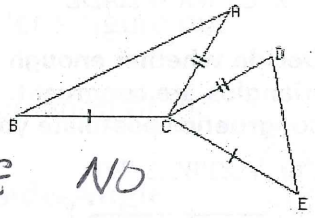
5.



$\triangle ACB \cong \triangle DFE$ SSS

$AC = 8$ $DF = 8$
$CB = x+2$ $EF = x+2$
$AB = 10$ $DE = 10$

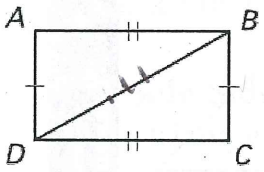
6.



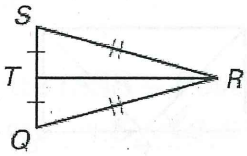
NO

Determine if the given congruence statement is correct. If it is not, correct it.

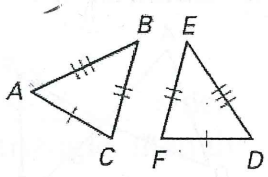
7. $\triangle ABD \cong \triangle CDB$ yes ✓ correct



8. $\triangle RST \cong \triangle RQT$ correct

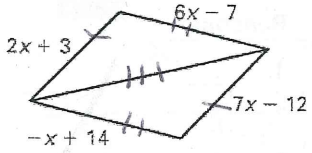


9. $\triangle ABC \cong \triangle DEF$



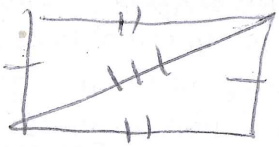
correct

10. Determine all values of x that would make the 2 triangles congruent. Explain.



$2x+3 = 7x-12$ $6x-7 = -x+14$
$15 = 5x$ $7x = 21$
$x = 3$ $x = 3$

11. Mrs. Gibbons is making a sandwich for her two twin girls. She uses 2 rectangular pieces of bread to make one sandwich and then cuts along the diagonal. Are the two triangular sandwiches congruent? Explain.



yes, SSS

LESSON 4.3

NAME _____ DATE _____

Practice A

For use with pages 212–219

Use the diagram. Name the included angle between the pair of sides given.

1. $\overline{MT}$ and $\overline{TR}$ ∠MTR
2. $\overline{TQ}$ and $\overline{RT}$
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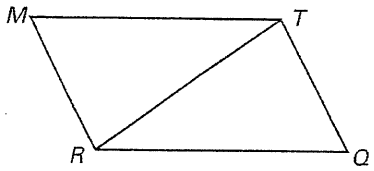

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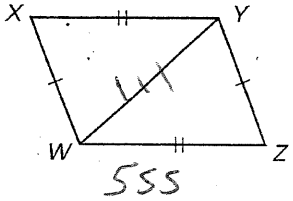
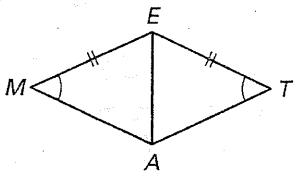
Decide whether enough information is given to prove that the triangles are congruent. If there is enough information, state the congruence postulate you would use.

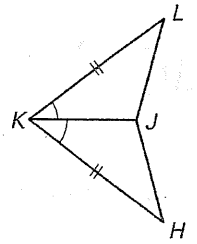
10. $\triangle XYW$, $\triangle ZWY$



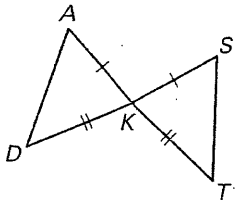
11. $\triangle MAE$, $\triangle TAE$



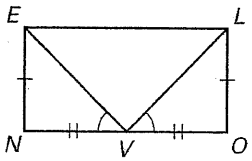
12. $\triangle KHJ$, $\triangle JLK$



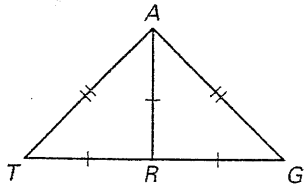
13. $\triangle DKA$, $\triangle TKS$



14. $\triangle ENV$, $\triangle LOV$

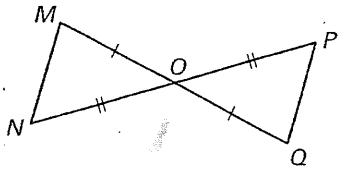


15. $\triangle TRA$, $\triangle ARG$



Complete the proof by supplying the reasons.

16. **Given:** O is the midpoint of $\overline{MQ}$.
O is the midpoint of $\overline{NP}$.
Prove: $\triangle MON \cong \triangle QOP$



Statements	Reasons
1. O is the midpoint of $\overline{MQ}$.	1. ?
2. $\overline{MO} \cong \overline{QO}$	2. ?
3. O is the midpoint of $\overline{NP}$.	3. ?
4. $\overline{NO} \cong \overline{PO}$	4. ?
5. $\angle MON \cong \angle QOP$	5. ?
6. $\triangle MON \cong \triangle QOP$	6. ?

Lesson 4.3