

Similarity: same shape, different sizes

- Shapes can be translated, rotated or dilated and still be similar!

Angles are Congruent Sides are proportional

- Scale Factor: the multiplier in dilations

Similarity Criteria:

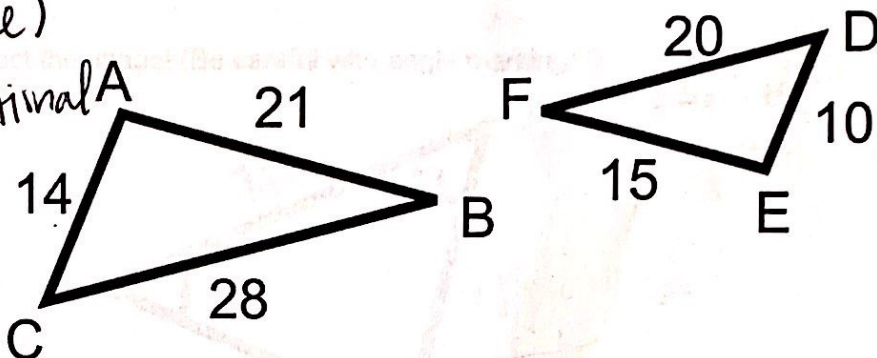
1. SSS (Side-Side-Side)

All sides are proportional

$$\frac{14}{10} \stackrel{?}{=} \frac{21}{15} \stackrel{?}{=} \frac{28}{20}$$

$$\downarrow$$

$$1.4 \stackrel{?}{=} 1.4 \stackrel{?}{=} 1.4$$



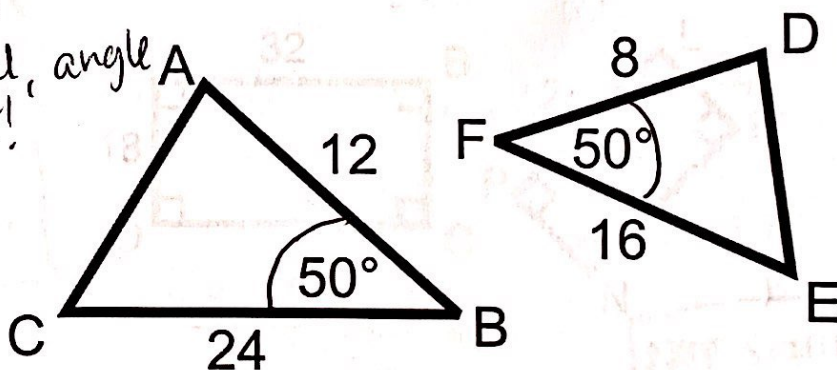
2 SAS (Side-Angle-Side)

Two sides are proportional, angle in between is congruent!

$$\frac{12}{8} \stackrel{?}{=} \frac{24}{16}$$

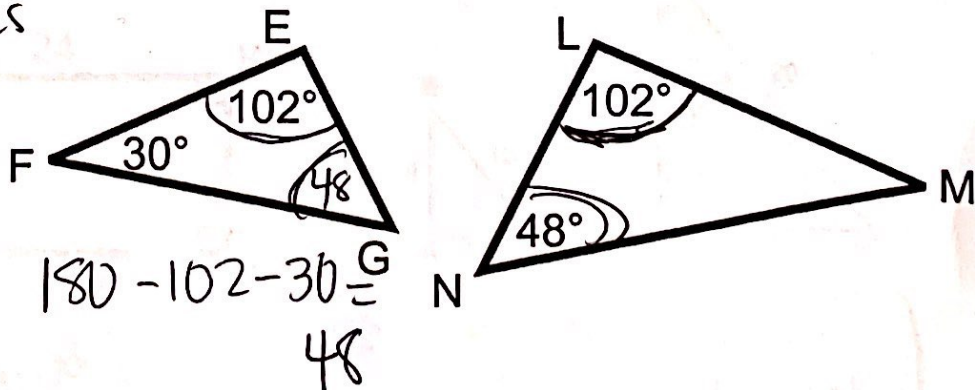
$$\downarrow$$

$$1.5 \stackrel{?}{=} 1.5$$

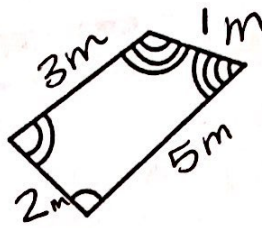
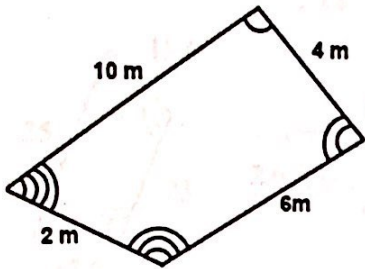


3. AA (Angle-Angle)

Two or more angles are congruent

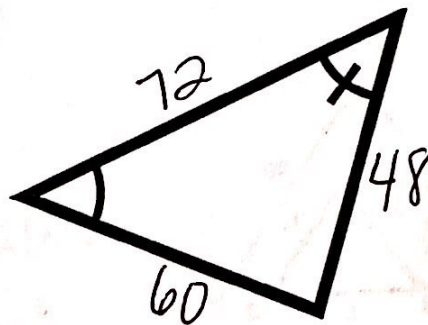
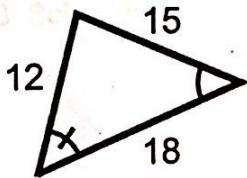


1. Using the scale factor of  $\frac{1}{2}$  to construct the image! (Be careful with angle markings!)



*\* Multiply each side by  $\frac{1}{2}$*

2 Using the scale factor of 4 to construct the image! (Be careful with angle markings!)

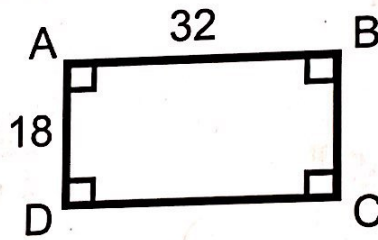
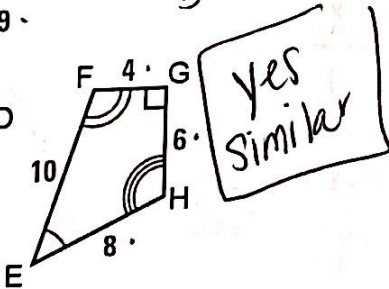
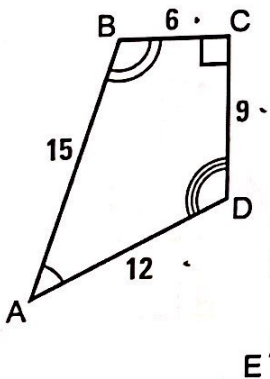


*\* Multiply by 4!*

Are the following Similar?

$$\frac{4}{6} \stackrel{?}{=} \frac{6}{9} \stackrel{?}{=} \frac{8}{12} \stackrel{?}{=} \frac{10}{15} \checkmark$$

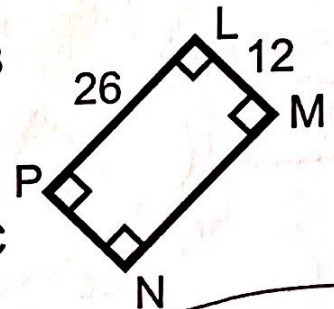
$$\frac{2}{3} \checkmark$$



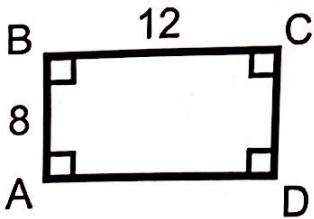
$$\frac{18}{12} \stackrel{?}{=} \frac{32}{26} \times$$

$$\downarrow$$

$$1.5 \neq 1.23$$

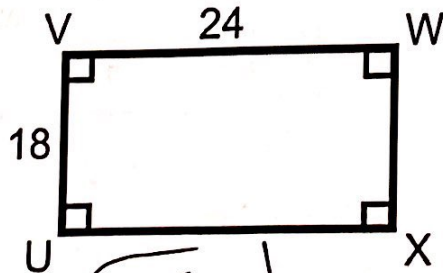


**NOT SIMILAR**

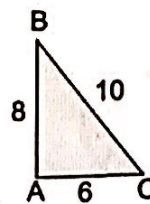


$$\frac{8}{18} \stackrel{?}{=} \frac{12}{24}$$

$$.44 \neq .5$$

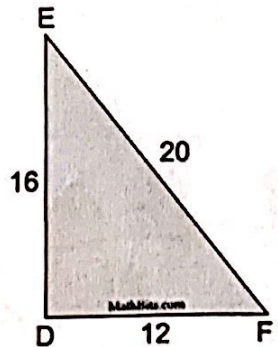


**NOT SIMILAR**



$$\frac{6}{12} \stackrel{?}{=} \frac{8}{16} \stackrel{?}{=} \frac{10}{20} \checkmark$$

$$.5 \checkmark$$



**yes similar**

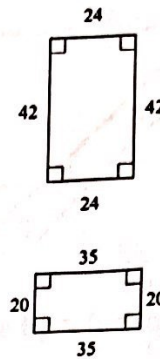
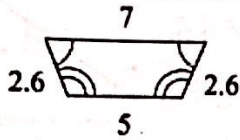
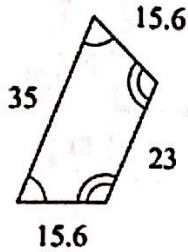
NIT 8 - Similarity Review

Name: \_\_\_\_\_

$$\frac{2.6}{15.6} \stackrel{?}{=} \frac{5}{23} \stackrel{?}{=} \frac{7}{35} \quad \times$$

$.167 \neq .217 \neq .2$

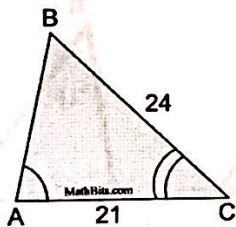
**NOT SIMILAR**



$$\frac{24}{20} = \frac{42}{35} \quad \checkmark$$

**Yes, SIMILAR**

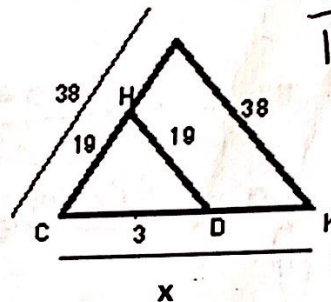
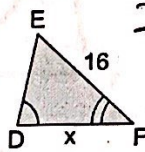
3. Solve for x:



$$\frac{21}{x} = \frac{24}{16}$$

$$24x = 21 \cdot 16$$

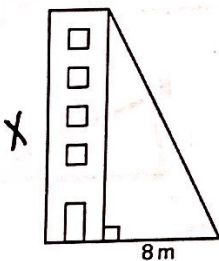
**x = 14**



$$\frac{38}{19} = \frac{x}{3}$$

$$19x = 38 \cdot 3$$

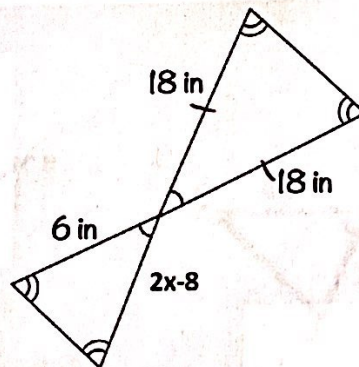
**x = 6**



$$\frac{x}{1} = \frac{8}{0.2}$$

$$2x = 8$$

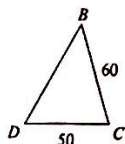
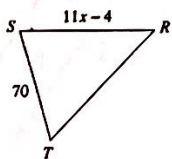
**x = 40**



$$6 = 2x - 8$$

**x = 7**

If  $\triangle TSR \sim \triangle DCB$



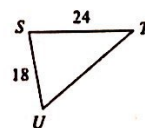
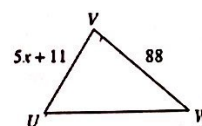
$$\frac{70}{50} = \frac{11x-4}{60}$$

$$70 \cdot 60 = 50(11x-4)$$

$$4200 = 550x - 200$$

**x = 8**

If  $\triangle UVW \sim \triangle UST$



$$\frac{5x+11}{18} = \frac{88}{24}$$

$$18 \cdot 88 = 24(5x+11)$$

$$1584 = 120x + 264$$

**x = 11**

$\frac{20}{32} = \frac{x}{x+21}$   
 $32x = 20(x+21)$   
 $32x = 20x + 420$   
 $12x = 420$   
 $x = 35$

$\frac{6}{21} = \frac{8}{8+x}$   
 $168 = 6(8+x)$   
 $168 = 48 + 6x$   
 $x = 20$

4. Determine if the following triangles are ~~similar~~ <sup>Similar</sup>. If so, state by which criteria.

$180 - 41 - 53 = 86$   
**NOT SIMILAR**

**YES, SIMILAR by SSS**  
 $\frac{32}{64} = \frac{61}{122} = \frac{72}{144} \checkmark$

**YES SIMILAR by AA**

$\frac{39}{13} \neq \frac{60}{15}$   
**NOT SIMILAR**

**YES SIMILAR by SAS**  
 $\frac{12}{30} = \frac{20}{50}$

$\frac{34}{74} \neq \frac{44}{88}$   
**NOT SIMILAR**

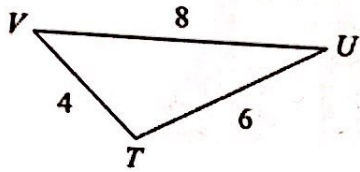
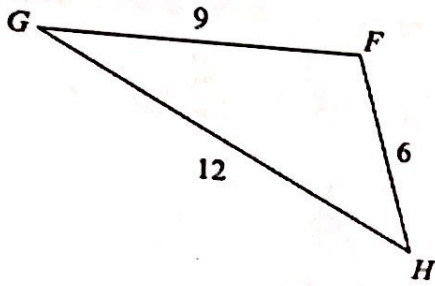
$\frac{15}{20} \neq \frac{18}{25}$   
**NOT SIMILAR**

**YES, SIMILAR by AA**

**YES, SIMILAR by AA**

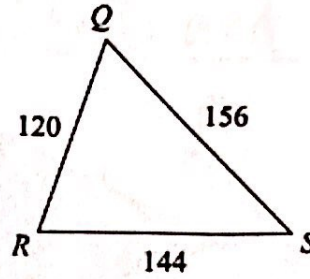
UNIT 8 - Similarity Review

Name: \_\_\_\_\_



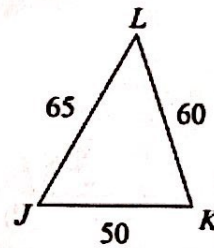
$$\frac{6}{4} = \frac{9}{6} = \frac{12}{8} \checkmark$$

SIMILAR by SSS



$$\frac{120}{50} = \frac{144}{60} = \frac{156}{65} \checkmark$$

Yes SIMILAR by SSS



5. Draw and Label a picture to solve:

A 10-foot flagpole casts a shadow that is 14 feet long. If the light pole casts a shadow that is 20 feet long, how tall is the light pole?



$$\frac{10}{x} = \frac{14}{20}$$

$$14x = 200$$

$$x = 14.29 \text{ feet}$$

The dugout is 8 feet tall and casts a shadow that is 3 feet long. If the fence casts a shadow that is 12 feet long, how tall is the fence?

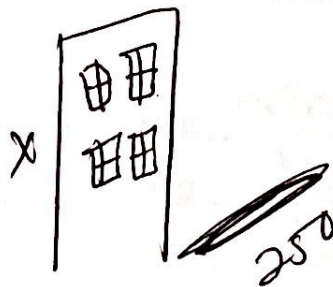


$$\frac{8}{x} = \frac{3}{12}$$

$$3x = 96$$

$$x = 32 \text{ feet}$$

Mrs. Lassiter is 5 feet tall and her shadow is 20 feet long. The school casts a shadow of 250 feet. How tall is the school?



$$\frac{5}{x} = \frac{20}{250}$$

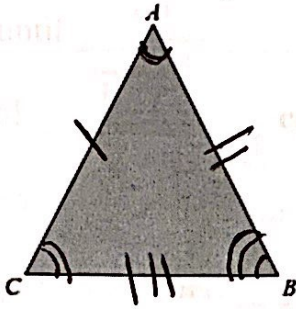
$$20x = 1250$$

$$x = 62.5 \text{ feet}$$

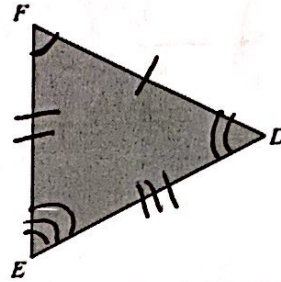
Congruency:

Congruence Symbol:  $\cong$

What does it mean to be Congruent: two shapes that are the same size. Congruent (equal) sides and angles



$\cong$



$\triangle ABC \cong \triangle FED$

Congruency Statement: tells us what parts are congruent.

Using the given congruency statement, find the corresponding congruent parts:

$\triangle KLM \cong \triangle ARN$

1.  $\angle K \cong \angle A$

2.  $\angle N \cong \angle M$

3.  $\angle R \cong \angle L$

4.  $\angle M \cong \angle N$

5.  $\overline{LM} \cong \overline{RN}$

6.  $\overline{AR} \cong \overline{KL}$

7.  $\overline{NA} \cong \overline{MK}$

8.  $\overline{LK} \cong \overline{RA}$

$\square LOPX \cong \square ERCY$

9.  $\angle P \cong \angle C$

10.  $\angle E \cong \angle L$

11.  $\angle R \cong \angle O$

12.  $\angle Y \cong \angle X$

13.  $\overline{LO} \cong \overline{ER}$

14.  $\overline{CY} \cong \overline{PX}$

15.  $\overline{OP} \cong \overline{RC}$

16.  $\overline{XL} \cong \overline{YE}$

We can prove two shapes are congruent through transformations.

To do this we want to match:

Point to Point by using Translation

Line to line by using Rotation

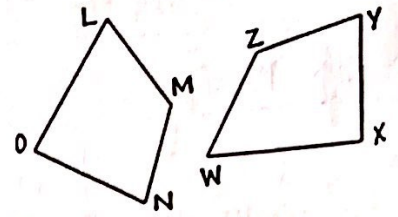
Plane to plane by using Reflection

**Congruent Figures:**

Are these two figures congruent? Circle an option below.

**YES, CONGRUENT**

**NO, NOT CONGRUENT**



- IF YES, fill in the following statement:

Translate until  $\angle L$  coincides with  $\angle W$ ,

Rotate until  $\overline{LO}$  coincides with  $\overline{WX}$ ,

Reflect over  $\overline{LO}$ .

- IF NO, explain why here: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Congruent Figures:**

Are these two figures congruent? Circle an option below.

**YES, CONGRUENT**

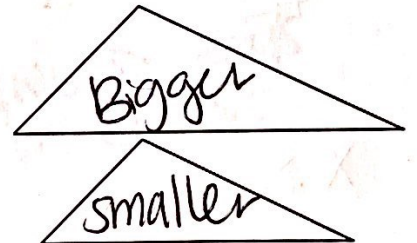
**NO, NOT CONGRUENT**

- IF YES, fill in the following statement:

Translate until \_\_\_\_\_ coincides with \_\_\_\_\_,

Rotate until \_\_\_\_\_ coincides with \_\_\_\_\_,

Reflect over \_\_\_\_\_.



- IF NO, explain why here: One shape is

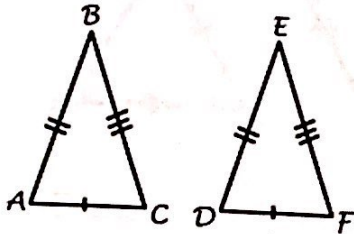
larger than the other!

If two figures are congruent, is it possible that you and your neighbor could have gotten different answers on how to prove they are congruent?

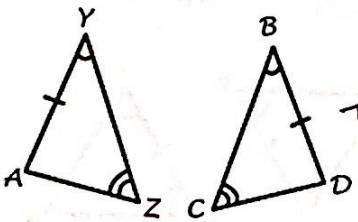
Yes, using different points and sides!

Triangle Congruency Criteria: helps us prove triangles are congruent by looking for congruent parts

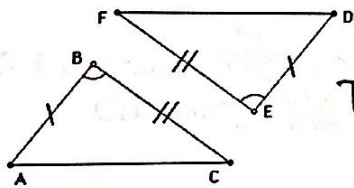
**Triangle Criteria That Works:**



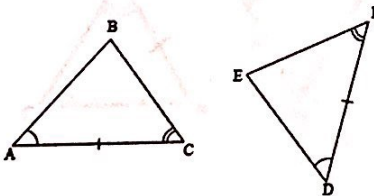
**SSS**  
 \* Three congruent sides



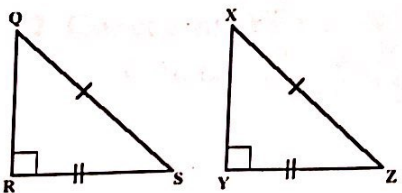
**AAS**  
 Two angles and a side are congruent



**SAS**  
 Two sides are congruent and the angle in between



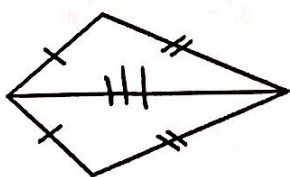
**ASA**  
 Two congruent angles and the side in between



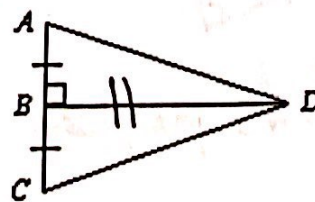
**HL - Right Angle and congruent hypotenuse and leg**

looks like a Donkey! Needs Right Angle.

**Reflexive Property: We share a side, it must be congruent**

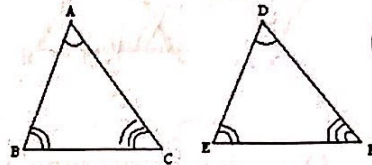


\* Congruent by SSS!



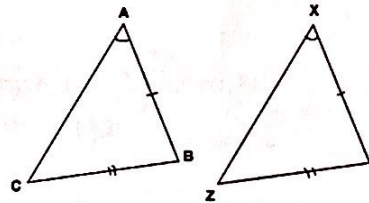
\* Congruent by SAS

**Triangle Criteria That Does Not Work:**



~~AAA~~

\* Dead Batteries!  
 \* NO car will get roadside assistance on the test.



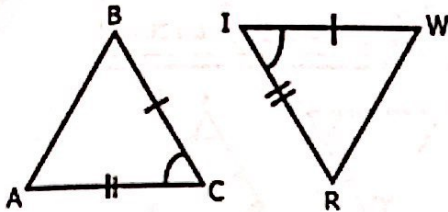
~~ASS  
SSA~~

\* NO Donkeys in class.

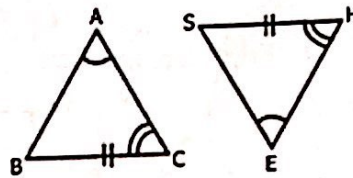


Line if the following triangles are congruent. If so, state by which criteria:

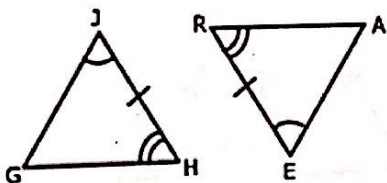
1. Congruent: YES or NO  
Criteria: SAS



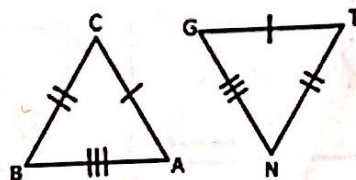
2. Congruent: YES or NO  
Criteria: AAS



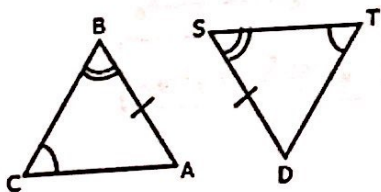
3. Congruent: YES or NO  
Criteria: AAS



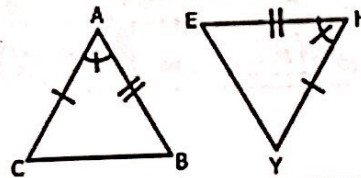
4. Congruent: YES or NO  
Criteria: SSS



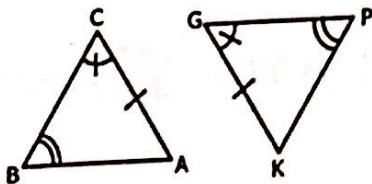
5. Congruent: YES or NO  
Criteria: AAS



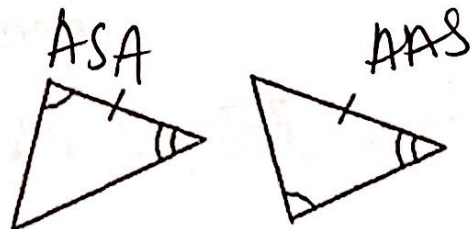
6. Congruent: YES or NO  
Criteria: SAS



7. Congruent: YES or NO  
Criteria: AAS

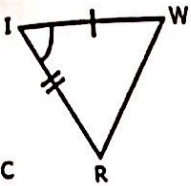
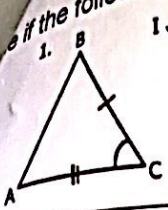


8. Congruent: YES or NO  
Criteria: \_\_\_\_\_

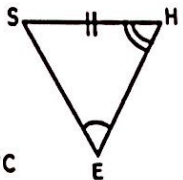
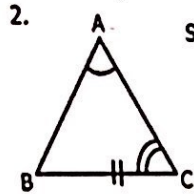


~~They don't match~~

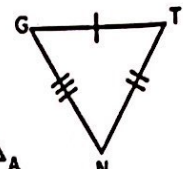
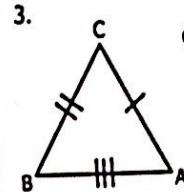
1. If the following are congruent, if so complete the congruence statement and state by what criteria?



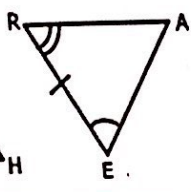
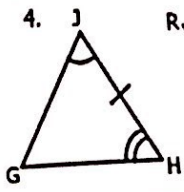
$\triangle ABC \cong \triangle RIW$  by SAS



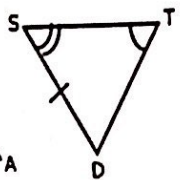
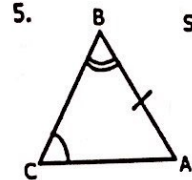
$\triangle ABC \cong \triangle ESH$  by AAS



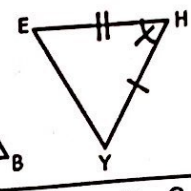
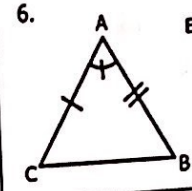
$\triangle ABC \cong \triangle GNT$  by SSS



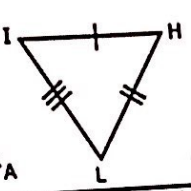
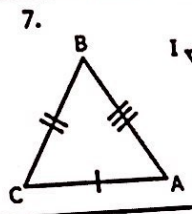
$\triangle GHJ \cong \triangle ARE$  by ASA



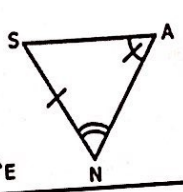
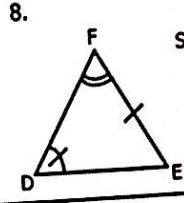
$\triangle ABC \cong \triangle DST$  by AAS



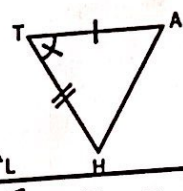
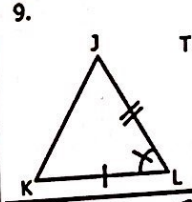
$\triangle ABC \cong \triangle HEY$  by SAS



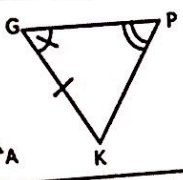
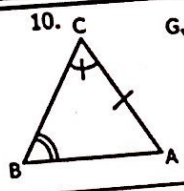
$\triangle ABC \cong \triangle ILH$  by SSS



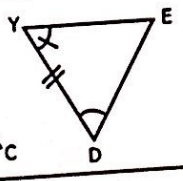
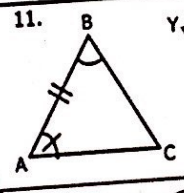
$\triangle DEF \cong \triangle ASN$  by AAS



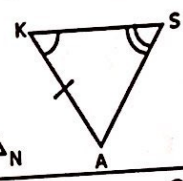
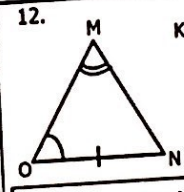
$\triangle JKL \cong \triangle HAL$  by SAS



$\triangle ABC \cong \triangle LPG$  by AAS



$\triangle ABC \cong \triangle YDE$  by ASA



$\triangle MNO \cong \triangle SAK$  by AAS

13. If two figures are congruent, must be true about their matching (corresponding) parts?  
 They must also be congruent (sides and angles!)  
 14. Complete the following statements using this congruence statement.

$ABCDE \cong VZYWX$

$\angle CDE \cong \angle YWZ$   $ED \cong \overline{XW}$   $\angle AED \cong \angle VXW$   $\overline{VZ} \cong \overline{AB}$   $\angle ABC \cong \angle VZY$