

Lesson 7-3L: Triangle Similarity SAS~ , AA~

Agenda

- Check & Review 7.2
- 7-3 Exploration and Guided Notes
- Need compass and ruler

G (, +S)

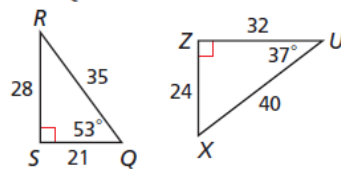
Homework:

- Text p. 475 # 11, 12, 16, 17, 20, 23, 24, 32, 36
- CR#6 due Th. 2/16

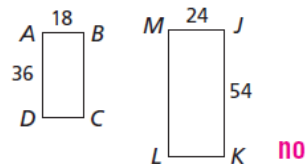
Multi-Step Determine whether the polygons are similar. If so, write the similarity ratio and a similarity statement.

9. $\triangle RSQ$ and $\triangle UXZ$

9. yes; $\frac{7}{8}$;
 $\triangle RSQ \sim \triangle UXZ$

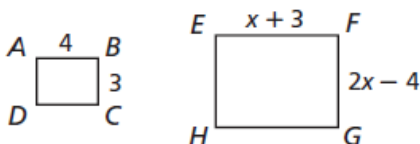


10. rectangles $ABCD$ and $JKLM$

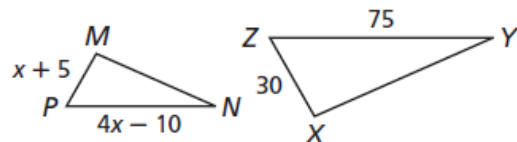


Find the value of x .

19. $ABCD \sim EFGH$ **5**



20. $\triangle MNP \sim \triangle XYZ$ **15**

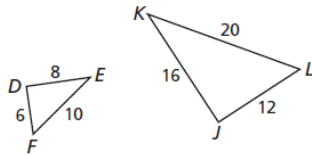


23. $\square JKLM \sim \square NOPQ$. If $m\angle K = 75^\circ$, name two 75° angles in $\square NOPQ$. **$\angle O$; $\angle Q$**

24. A dining room is 18 ft long and 14 ft wide. On a blueprint for the house, the dining room is 3.5 in. long. To the nearest tenth of an inch, what is the width of the dining room on the blueprint? **2.7 in.**

Verify that the triangles are similar.

3. $\triangle DEF$ and $\triangle JKL$



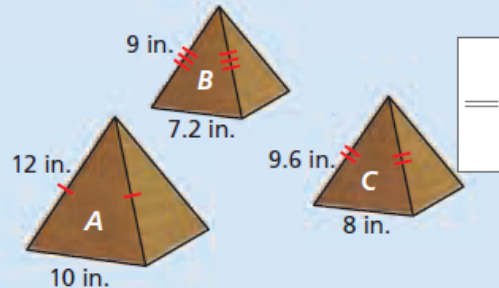
Draw $\triangle JKL$ and $\triangle MNP$. Determine if you can conclude that $\triangle JKL \sim \triangle MNP$ based on the given information. If so, which postulate or theorem justifies your response?

21. $\frac{JK}{MN} = \frac{KL}{NP} = \frac{JL}{MP}$
 yes; SSS ~

25. This problem will prepare you for the Multi-Step Taks Prep on page 478.

The set for an animated film includes three small triangles that represent pyramids.

- Which pyramids are similar? Why?
- What is the similarity ratio of the similar pyramids? $\frac{5}{4}$



37. **Gridded Response** If 6, 8, and 12 and 15, 20, and x are the lengths of the corresponding sides of two similar triangles, what is the value of x? **30**

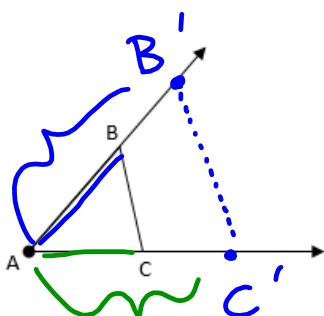
Regents Geometry LAB Name _____ Date _____ Section _____

Lesson 7-3L: Triangle Similarity Criteria SAS~ and AA~

Recall the Definition of Similar Polygons: Two polygons are similar if and only if their corresponding angles are congruent and their corresponding sides are proportional in the same similarity ratio.

Triangle Similarity Criteria: SAS~

Consider a triangle that we want to map onto another using the common vertex as the center of dilation (note that we could have used rigid motions to map onto the common vertex first). Explain what would be needed in order to map B to B' and C to C' with the center of dilation at A such that $\triangle ABC \sim \triangle A'B'C'$?



$\frac{AB}{AB'} = \text{SIM RATIO} = \frac{AC}{AC'}$

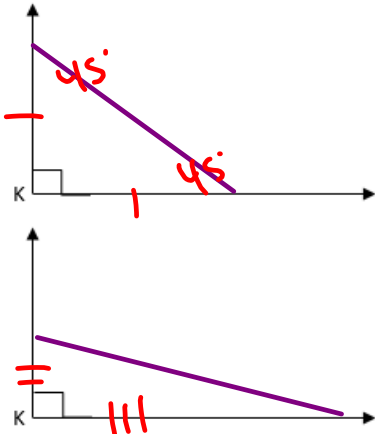
$\frac{AB'}{AB}$ SCALE FACTOR

NEED INCLUDED \times \rightarrow
 TO MAP B' ONTO AB
 C' ONTO AC

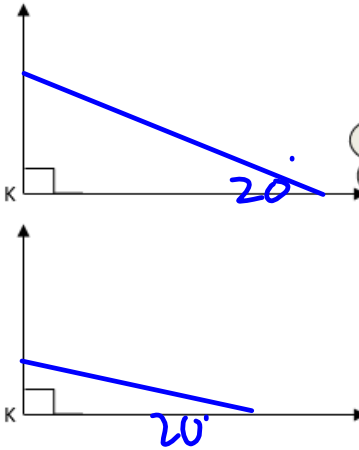
Triangle Similarity Criteria: AA~

Having one angle measure alone was not enough, as we saw in SAS~. Given that angle K is a right angle, can you draw two triangles such that they are...

Neither similar nor congruent?



Similar but not congruent? What did you need?



AA~
Not ALL right triangles are similar nor congruent!

Why does AA~ criteria work?

B/C ANGLE-SIDE RELATIONSHIPS WITHIN ΔS

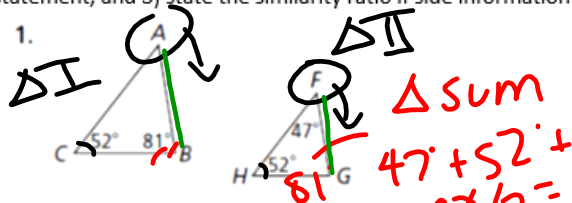
Why don't we need AAA~?

3RD & THM

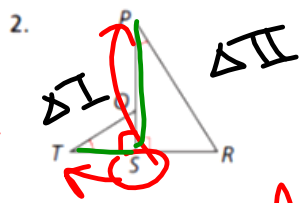
Triangle Similarity Criteria	Example	Similarity Statement	Similarity Ratio
AA~AA		$\triangle ABC \sim \triangle DEF$	
SAS~SAS		$\triangle ABC \sim \triangle DEF$	$\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$
SSS~SSS		$\triangle ABC \sim \triangle DEF$	

DETERMINING AND APPLYING TRIANGLE SIMILARITY CRITERIA

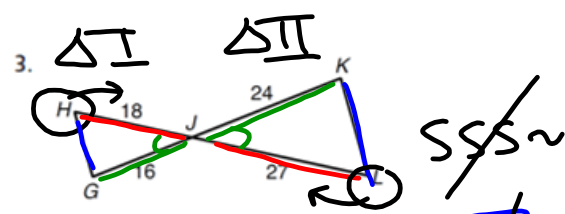
Identify if the sets of triangles meet triangle similarity criteria. If so, 1) state which criteria is met and 2) write a similarity statement, and 3) state the similarity ratio if side information is provided.



Criteria: AA ~
 Statement: $\triangle ABC \sim \triangle FGH$
 Proportion: $\frac{\Delta I}{\Delta II} : \frac{AB}{FG}$
 ex: $\frac{\Delta I}{\Delta II} : \frac{AB}{FG}$

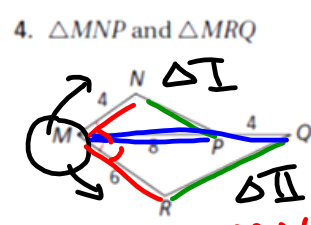


Criteria: AA ~
 Statement: $\triangle STO \sim \triangle SPR$
 Proportion: $\frac{\Delta I}{\Delta II} : \frac{ST}{SP}$



$\frac{\Delta I}{\Delta II} : \frac{HJ}{LJ} = \frac{JG}{JK} = \frac{HG}{LK}$
 $\frac{18}{27} = \frac{16}{24} = \frac{27}{27}$
 $\frac{2}{3} = \frac{2}{3} \checkmark$

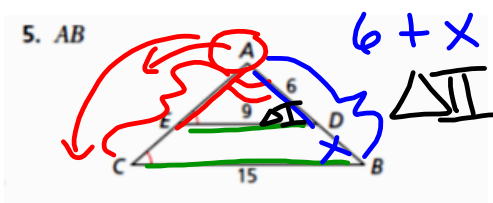
Criteria: SAS ~
 Statement: $\triangle HJG \sim \triangle LJK$
 Similarity Ratio: $\frac{2}{3}$



$\frac{\Delta I}{\Delta II} : \frac{MN}{MR} = \frac{NP}{RQ} = \frac{MP}{MQ}$
 $\frac{4}{4} = \frac{6}{6} = \frac{8}{8}$
 $1 = 1 = 1$

Criteria: SAS ~
 Statement: $\triangle MNP \sim \triangle MRQ$
 Similarity Ratio: $\frac{2}{3}$

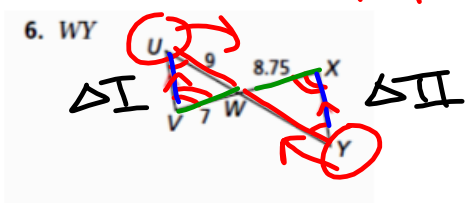
Identify if the sets of triangles meet triangle similarity criteria. If so, 1) state which criteria is met and 2) write a similarity statement, 3) state the similarity ratio, and 4) write a proportion to solve for the missing side.



Criteria: $AA \sim$
 Statement: $\triangle AED \sim \triangle ACB$

Similarity Ratio: $\frac{\triangle AED}{\triangle ACB} = \frac{9}{15} = \frac{6}{6+X}$

Proportion: $\frac{9}{15} = \frac{6}{6+X}$
 $AB = 6 + X$



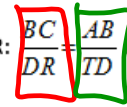
Criteria: $AA \sim$
 Statement: $\triangle UVW \sim \triangle YWX$

Similarity Ratio: $\frac{\triangle UVW}{\triangle YWX} = \frac{9}{7} = \frac{7}{8.75}$

Proportion: $\frac{9}{7} = \frac{7}{8.75}$
 $= \frac{4}{5}$

$AA \sim$
 $SAS \sim$
 $SSS \sim$

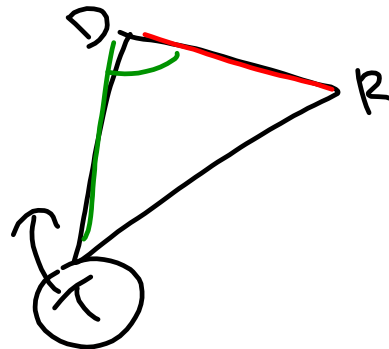
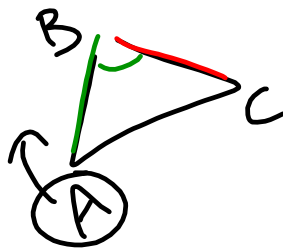
7) Provided is some information about the two triangles $\triangle ABC$ and $\triangle TDR$:



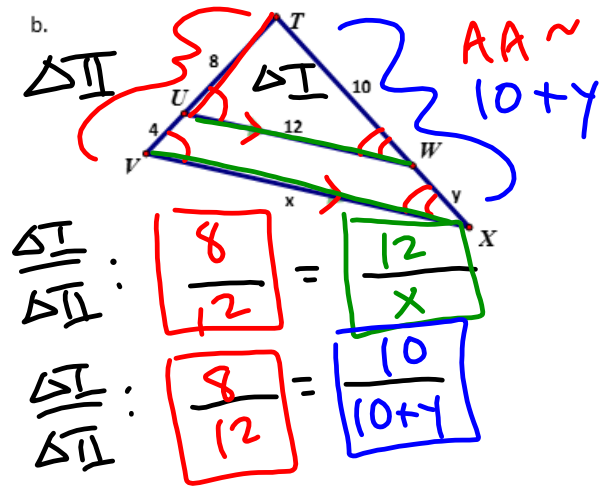
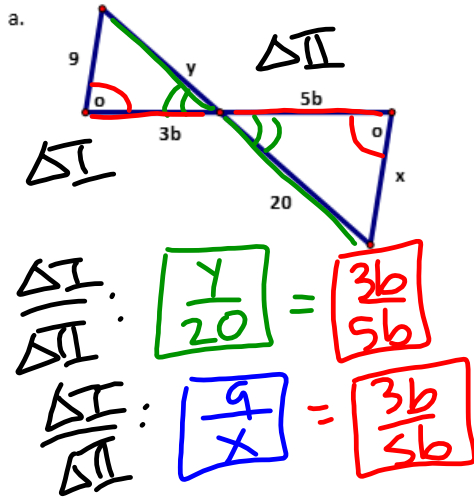
$AA \sim$
 ~~$SSS \sim$~~
 ~~$SAS \sim$~~

From this information, can you conclude that $\triangle ABC \sim \triangle TDR$? NO

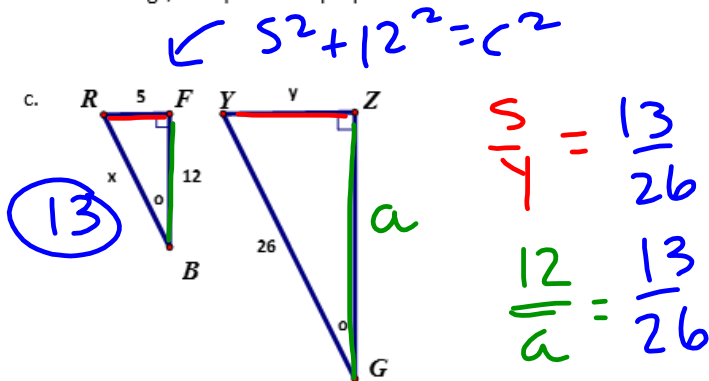
What additional piece of information would be needed? $AB \cong TD$



8) Given the drawings, set up the two proportions that could be used to solve for x and y.



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9) Given right $\triangle ABC$ with right angle B and altitude \overline{BD} ,

1. Are all three triangles similar? YES By what criteria? AA ~

2. Write a similarity statement for the three triangles:

$$\triangle ABD \sim \triangle BCD \sim \triangle ACB$$

