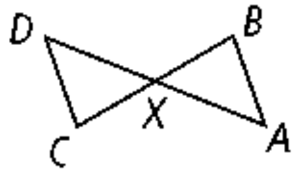
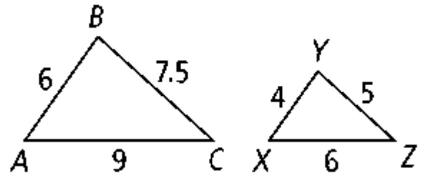
Geometry H | **NAME:** DIAZ
Mrs. Diaz | **DATE:**

UNIT 5
ASSIGNMENT #6 | **Introduction to Proving Triangles are Similar**

OBJECTIVE: **S.W.B.A.T. start making similar statements about triangles, which will lead to completing two column proofs.**

GUIDED EXAMPLE 1

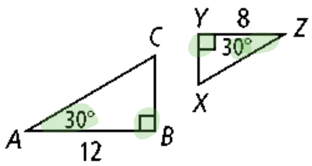
Are the triangles similar? How do you know? Write a similarity statement.

AA Similarity Theorem	SSS Similarity Theorem
 **Given:** $\overline{DC}\|\|\overline{BA}$ Because $\overline{DC}\|\|\overline{BA}$, $< A$ and $\angle D$ are alternate interior angles and are therefore $\cong$. The same is true for $\angle B$ and $\angle C$. ***So, by AA ~ Postulate, $\Delta ABX \sim \Delta DCX$***	 Compare the ratios of the lengths of sides: $\frac{AB}{XY}=\frac{BC}{YZ}=\frac{CA}{ZX}=\frac{3}{2}$ ***So, by SSS ~ Theorem, $\Delta ABC \sim \Delta XYZ$***
NOTE: ***There are a total of three (3) similarity theorems. The only not addressed today is SAS Similarity Theorem. This one will be addressed on your homework.***	

Exercises

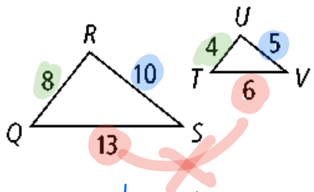
Determine whether the triangles are similar. If so, write a similarity statement and name the postulate or theorem you used. If not, explain.

1.



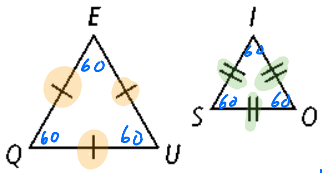
AA similarity

2



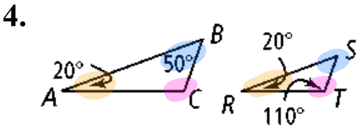
not similar

3



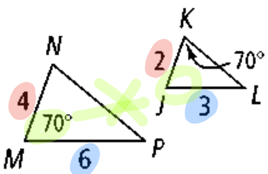
AA or SSS b/c equilateral therefore equiangular

4.



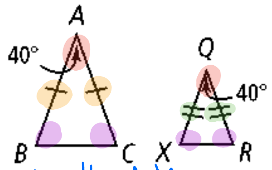
AA similarity

5.



Not similar

6.



both of these are isoscele, therefore AA similarity

7. Are all equilateral triangles similar? Explain.

Yes, all angles are 60°

8. Are all isosceles triangles similar? Explain.

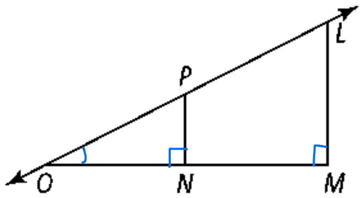
No, only similar if base angles are equal

9. Are all congruent triangles similar? Are all similar triangles congruent? Explain.

Yes, all congruent Δ are similar, but not all similar Δ are congruent

GUIDED EXAMLE #2

Provide the reason for each step in the two-column proof.



Given: $\overline{LM} \perp \overline{MO}$
$\overline{PN} \perp \overline{MO}$

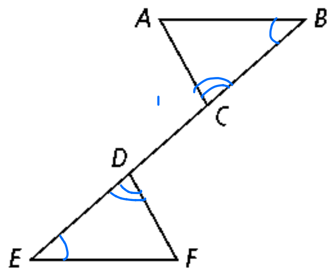
Prove: $\Delta LMO \sim \Delta PNO$

Statements	Reasons
1) $\overline{LM} \perp \overline{MO}, \overline{PN} \perp \overline{MO}$	1) Given
2) $\angle PNO$ and $\angle LMO$ are right $\angle$s.	2) Def of ⊥ lines
3) $\angle PNO = \angle LMO$	3) Def of right angles / substitution
4) $\angle O \cong \angle O$	4) Reflexive Property
5) $\Delta LMO \sim \Delta PNO$	5) AA similarity

10. Developing Proof Complete the proof by filling in the blanks.

Given: $\overline{AB} \parallel \overline{EF}, \overline{AC} \parallel \overline{DF}$

Prove: $\Delta ABC \sim \Delta FED$



Proof: $\overline{AB} \parallel \overline{EF}$ and $\overline{AC} \parallel \overline{DF}$ are given.

$\overline{EB}$ is a transversal by def of parallel lines

$\angle E \cong \angle B$ by alternate interior angles

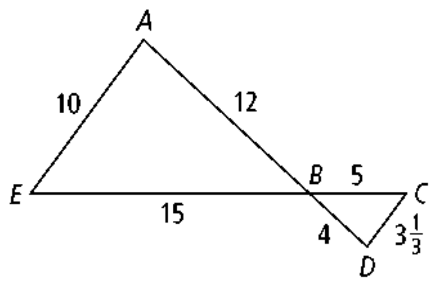
Similarly, $\angle EDF \cong \angle BCA$ by alternate exterior

So, $\Delta ABC \sim \Delta FED$ by AA similarity

11. Write a paragraph proof.

Given: $\overline{AD}$ and $\overline{EC}$ intersect at B.

Prove: $\Delta ABE \sim \Delta DBC$



Statement	Reason
1) $\overline{AD}$ and $\overline{EC}$ intersect at B	1) Given
2) $\angle ABE \cong \angle CBD$	2) vertical angles
3) $\frac{AB}{DB} = \frac{BE}{BC} = \frac{EA}{CD}$	3) Def of Δ proportions
4) $\frac{12}{4} = \frac{15}{5} = \frac{10}{3\frac{1}{3}}$	4) Substitution
5) Scale factor 3 : 1	5) Simplify
6) $\Delta ABE \sim \Delta DBC$	6) SSS similarity

You could also have $\frac{DB}{AB} = \frac{BC}{BE} = \frac{CD}{EA}$, which will result in a scale factor of 1 : 3

both ways result in SSS similarity

*Any correct combo of sides will work