Geometry
AA, SSS, and SAS Similarity

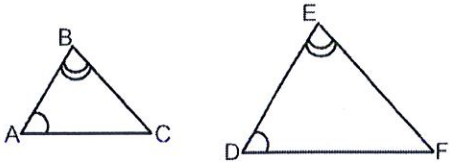
Name: _____
Date _____

There are three ways to prove that two triangles are similar:

1. Angle-Angle Similarity
2. Side-Side-Side Similarity
3. ~~Angle~~ Side-Angle-Side Similarity

Angle-Angle Similarity Postulate (AA~)

If two angles **of one triangle are congruent to two** angles **of another triangle, then the triangles are** similar.



WE SAY $\Delta ABC \sim \Delta$ DEF BY AA~.
WHAT DO YOU KNOW ABOUT $\angle C$ AND $\angle F$? WHY?

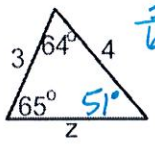
They're congruent! They're both 180 subtract the same numbers.

What do you know about the corresponding sides? They're proportional.

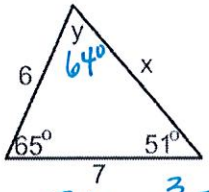
Why? definition of similar!

Verify that the triangles are similar, then solve for the variables.

1. triangles similar? YES! why? AA~



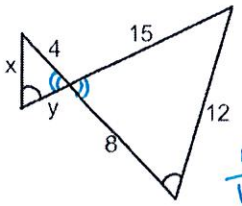
$\frac{3}{6} = \frac{4}{x}$ $\frac{3x}{3} = \frac{24}{3}$ $x = 8$



$\frac{3}{6} = \frac{z}{7}$ $6z = 21$ $z = \frac{21}{6} = \frac{7}{3}$

x = 8 y = 64° z = 7/3 or 3.5

2. triangles similar? YES why? AA~



$\frac{4}{15} = \frac{x}{12}$ $48 = 15x$ $x = \frac{48}{15} = \frac{16}{5}$

$\frac{4}{15} = \frac{y}{8}$ $15y = 32$ $y = \frac{32}{15}$

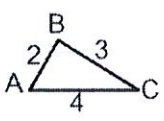
x = 16/5 y = 32/15

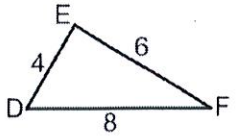
Side-Side-Side Similarity (SSS ~)

If three sides **of one triangle are proportional to three corresponding** sides **of another triangle,**
then the triangles are similar.

Since 2/4 = 3/6 = 4/8, then $\Delta ABC \sim \Delta DEF$.

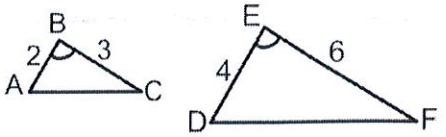
$\frac{2}{4} = \frac{1}{2}$ $\frac{3}{6} = \frac{1}{2}$ $\frac{4}{8} = \frac{1}{2}$





Side-Angle-Side Similarity (SAS~)

If two sides of one triangle are proportional to two sides of another triangle and their included angle **are congruent, then the triangles are similar.**

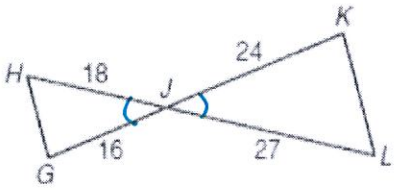


Since 2/4 = 3/6 and $\angle B \cong \angle E$, then $\Delta ABC \sim \Delta DEF$.

Practice! Determine if the triangles are similar. If they are, complete the similarity statement.

3. $\Delta GHJ \sim \Delta$ KLJ

by SAS~

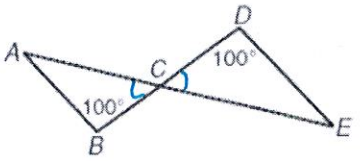


$\frac{16}{24} = \frac{18}{27}$

$\frac{2}{3} = \frac{2}{3}$ ✓

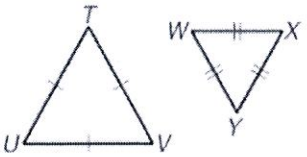
4. $\Delta ABC \sim \Delta$ EDC

by AA~



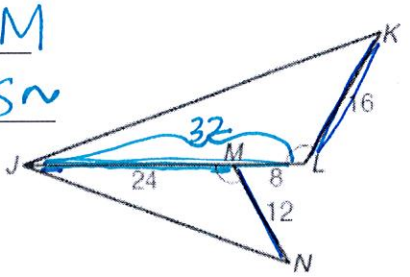
5. $\Delta TUV \sim \Delta$ YXW

by SSS~



6. $\Delta JKL \sim \Delta$ JNM

by SAS~

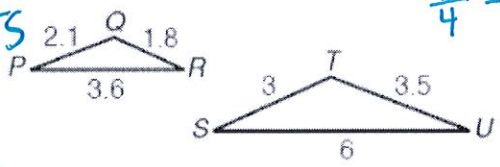


$\frac{12}{16} = \frac{24}{32}$

$\frac{3}{4} = \frac{3}{4}$ ✓

7. $\Delta PQR \sim \Delta$ STU VTS

by SSS~



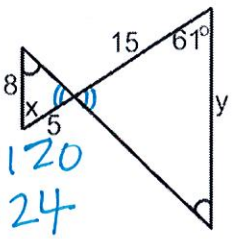
$\frac{1.8}{3} = \frac{2.1}{3.5} = \frac{3.6}{6}$

$0.6 = 0.6 = 0.6$

Verify that the triangles are similar, then solve for the variables.

8. $\Delta\sim$ AA~

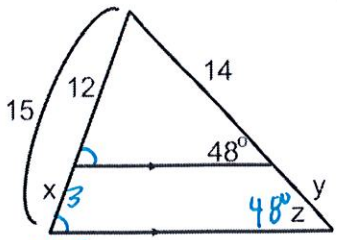
x = 61° y = 24



$\frac{5}{15} = \frac{8}{y}$ $5y = 120$ $y = 24$

9. $\Delta\sim$ AA~

x = 3 y = 3.5 z = 48°



$\frac{12}{15} = \frac{14}{14+y}$

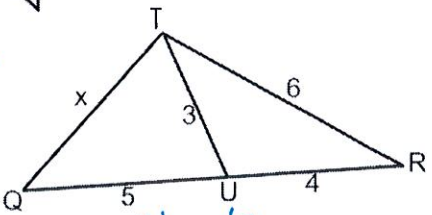
$12y + 168 = 210$

$12y = 42$

$y = 3.5$

10. $\Delta QTR \sim \Delta$ TVR by SAS~

x = 9/2 OR 4.5



$\frac{4}{6} = \frac{3}{x}$

$4x = 18$

$x = 18/4$

$\frac{4}{6} = \frac{6}{9}$

$\frac{2}{3} = \frac{2}{3}$ ✓

****Challenge Problem**