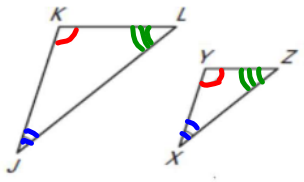
Geometry 1.2
Class-Notes (6.4 & 6.5)

Name_____
Date_____Period_____

Proving Triangles Similar by AA, SSS and SAS

Angle-Angle (AA) Similarity Theorem

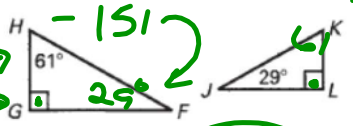
If two angles of one triangle are ___congruent___ to two angles of another triangle, then the two triangles are ___similar___.



$\angle K \cong \angle Y$, $\angle J \cong \angle X$, $\angle L \cong \angle Z$

Example 1:

a. Is $\Delta FGH \sim \Delta JLK$?



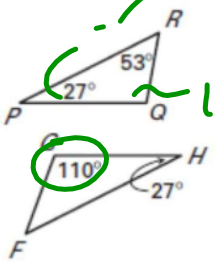
180 − 151

151°

A $\measuredangle G \cong \measuredangle L$
A $\measuredangle F \cong \measuredangle J$

YES

b. Is $\Delta FGH \sim \Delta RQP$?



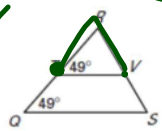
53+27= 80°

100°

NO

Example 2:

a. Is $\Delta RTV \sim \Delta RQS$?



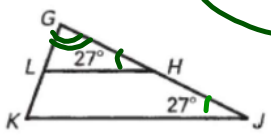
$\measuredangle Q \cong \measuredangle RTV$

$\measuredangle QRS \cong \measuredangle TRV$

yes: By AA

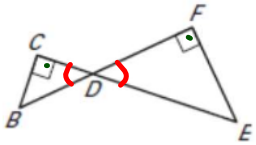
b. Is $\Delta GHL \sim \Delta GJK$?

YES :)



Example 3:

Show that ΔBCD ~ ΔEFD



∡C ≅ ∡F (90°)

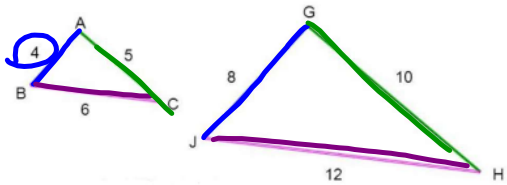
∡CDB ≅ ∡FDE (VERT. ∡S)

YES: BY ANGLE-ANGLE

Side-Side-Side (SSS) Similarity Theorem

If all three pairs of corresponding sides of two triangles are proportional, then the triangles are similar.

ΔABC ~ ΔGJH



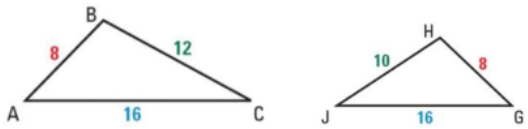
$\frac{AB}{GJ} = \frac{4}{8} = \frac{1}{2}$ $\frac{BC}{JH} = \frac{6}{12} = \frac{1}{2}$ $\frac{CA}{HG} = \frac{5}{10} = \frac{1}{2}$

Example 4:

a. Is ΔABC ~ ΔGHJ?

$\frac{AB}{GH} = \frac{BC}{HJ} = \frac{AC}{GJ}$

$\frac{1\cancel{8}}{1\cancel{8}} = \frac{\cancel{12}6}{\cancel{10}5} = \frac{\cancel{16}}{\cancel{16}}\frac{1}{1}$

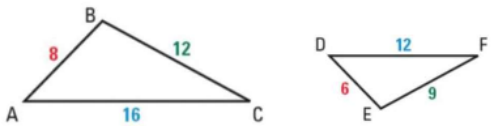


NOT SIMILAR!

b. Is ΔABC ~ ΔDEF?

$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

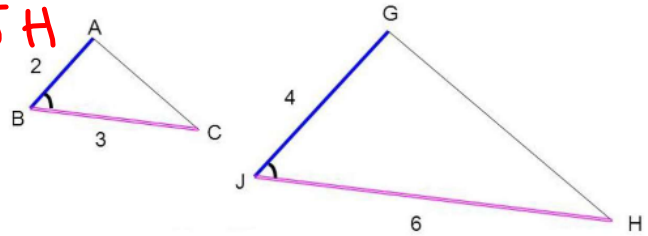
$\frac{4\cancel{8}}{3\cancel{6}} \stackrel{?}{=} \frac{\cancel{12}4}{\cancel{9}3} \stackrel{?}{=} \frac{\cancel{16}4}{\cancel{12}3}$



Side- Angle-Side (SAS) Similarity Theorem

If an angle of one triangle is congruent to an angle of another triangle and the sides including the angles are proportional, then the triangles are similar.

$\triangle ABC \sim \triangle GJH$



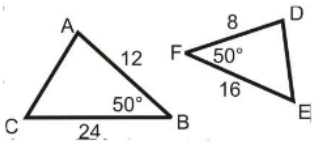
$\angle J \cong \angle B$ $\quad \frac{AB}{GJ} = \frac{2}{4} = \frac{1}{2}$ $\quad \frac{BC}{JH} = \frac{3}{6} = \frac{1}{2}$

Example : 5

YES :)

a. Is $\triangle ABC \sim \triangle DFE$? SAS

$\angle B \cong \angle F$ (50°)



$\frac{AB}{DF} = \frac{BC}{FE}$

$\frac{12}{8} = \frac{\cancel{24}\ 12}{\cancel{16}\ 8}$

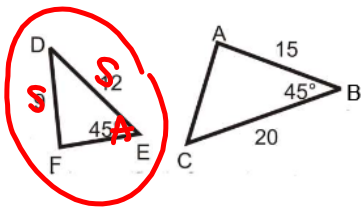
b. Is $\triangle ABC \sim \triangle DEF$?

NO

~~AA~~

SAS

~~SSS~~

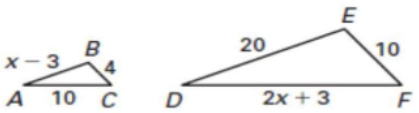


AA / SSS / SAS

Example 6:

a. Find the value the value of ***x*** that makes ΔABC ~ ΔDEF.

SSS



$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

$\frac{x-3}{20} = \frac{10}{2x+3}$

$\frac{x-3}{20} = \frac{\cancel{4}\,2}{\cancel{10}\,5} = \frac{10}{2x+3}$

$\frac{2}{5} = \frac{x-3}{20}$

$5(x-3) = 2(20)$

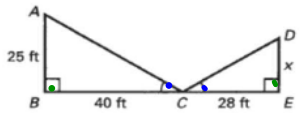
$5x - 15 = 40$

$5x = 55$

$x = 11$

$\frac{10}{2(11)+3} = \frac{10}{25} = \frac{2}{5}$ ☺

b. Find the value the value of ***x*** that makes ΔABC ~ ΔDEC



$\frac{AB}{DE} = \frac{BC}{EC} = \cancel{\frac{AC}{DC}}$

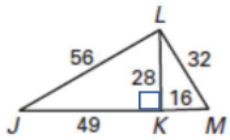
$\frac{25}{x} = \frac{\cancel{40}\,10}{\cancel{28}\,7}$

$10x = 175$

$x = 17.5\text{ ft}$

Example 7:

Is ΔJKL ~ ΔLKM?



$\frac{JK}{LK} = \frac{KL}{KM} = \frac{JL}{LM}$

$\frac{49}{28} = \frac{28}{16} = \frac{56}{32}$

$\frac{7}{4} = \frac{7}{4} = \frac{7}{4}$ ☺ Yes