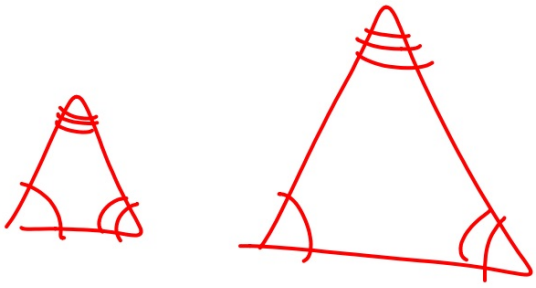
Geometry 7.3

Identify similar triangles using the AA, SAS, and SSS

Use similar triangles to solve problems

Third angle theorem
SSS
SAS (included angle)
AA
proportion

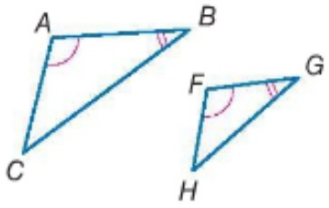


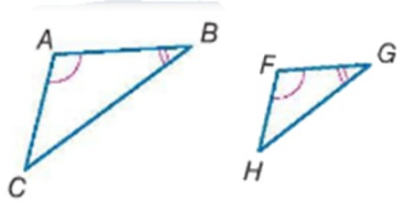
Works only for triangles

Postulate 7.1 Angle-Angle (AA) Similarity

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

Example If $\angle A \cong \angle F$ and $\angle B \cong \angle G$, then $\triangle ABC \sim \triangle FGH$.



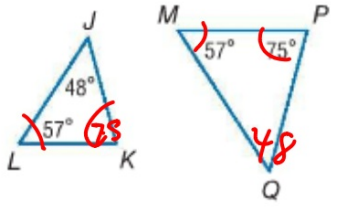


Remember: angle sum must be 180

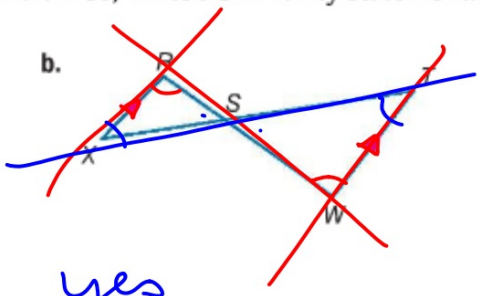
Example 1 Use the AA Similarity Postulate

Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.

a.



b.



yes

$\triangle JKL \sim \triangle QPM$

AA

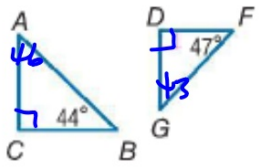
yes

$\triangle XRS \sim \triangle TWS$

AA

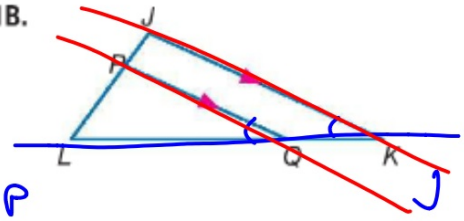
GuidedPractice

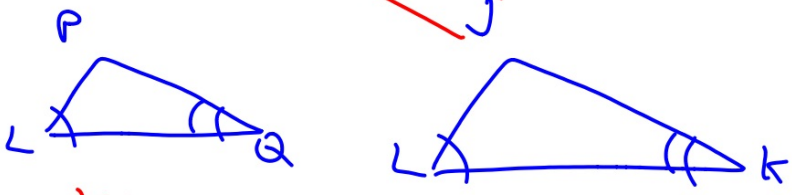
1A.



no

1B.





yes

$\triangle LPQ \sim \triangle LJK$

AA

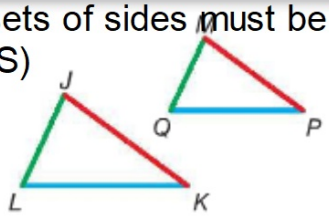
Theorems Points on Perpendicular Bisectors

7.2 Side-Side-Side (SSS) Similarity

If the corresponding side lengths of two triangles are proportional, then the triangles are similar.

Example If $\frac{JK}{MP} = \frac{KL}{PQ} = \frac{LJ}{QM}$, then $\triangle JKL \sim \triangle MPQ$.

All sets of sides must be proportional (SSS)

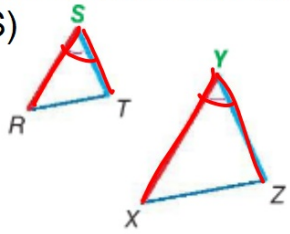


7.3 Side-Angle-Side (SAS) Similarity

If the lengths of two sides of one triangle are proportional to the lengths of two corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.

Example If $\frac{RS}{XY} = \frac{ST}{YZ}$ and $\angle S \cong \angle Y$, then $\triangle RST \sim \triangle XYZ$.

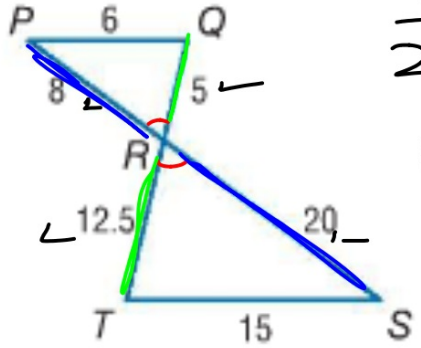
2 pairs of sides and INCLUDED angle (SAS)



Example 2 Use the SSS and SAS Similarity Theorems

Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.

a.



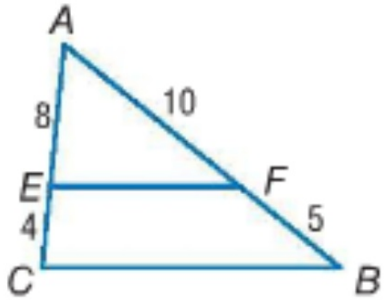
$\frac{8}{20}$ $\frac{5}{12.5}$

0.4 0.4

$\triangle PQR \sim \triangle STR$

SAS

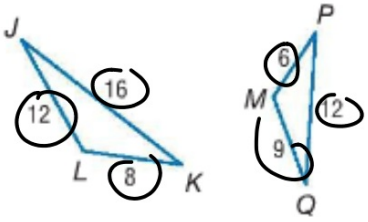
b.



SAS, SSS

GuidedPractice

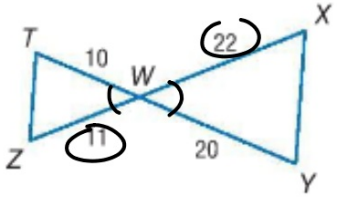
2A.



$\frac{16}{12}$ $\frac{8}{6}$ $\frac{12}{9}$

$1\frac{1}{3}$ $1\frac{1}{3}$ $1\frac{1}{3}$

2B.

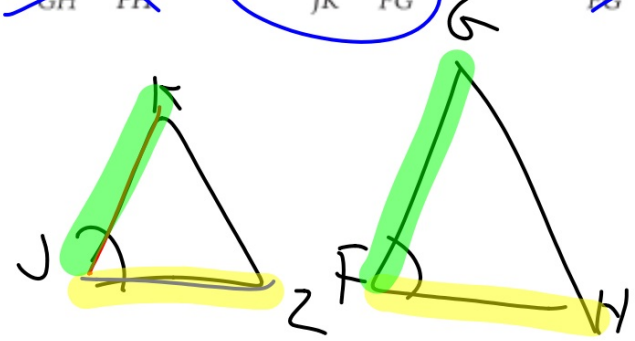


$\frac{22}{11}$ $\frac{20}{10}$

We have angles J and F congruent.
What else do we need?

3. If $\triangle JKL$ and $\triangle FGH$ are two triangles such that $\angle J \cong \angle F$, which of the following would be sufficient to prove that the triangles are similar?

F $\frac{KL}{GH} = \frac{JL}{FH}$ **G** $\frac{JL}{JK} = \frac{FH}{FG}$ **H** $\frac{JK}{FG} = \frac{KL}{GH}$ **J** $\frac{JL}{JK} = \frac{GH}{FG}$



Theorem 7.4 Properties of Similarity

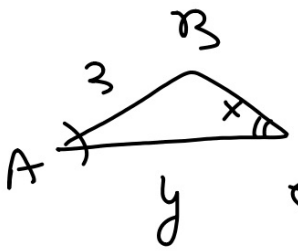
Reflexive Property of Similarity	$\triangle ABC \sim \triangle ABC$
Symmetric Property of Similarity	If $\triangle ABC \sim \triangle DEF$, then $\triangle DEF \sim \triangle ABC$.
Transitive Property of Similarity	If $\triangle ABC \sim \triangle DEF$, and $\triangle DEF \sim \triangle XYZ$, then $\triangle ABC \sim \triangle XYZ$.

Example 4 Parts of Similar Triangles

Draw separately...
Are they similar?
Proportion...

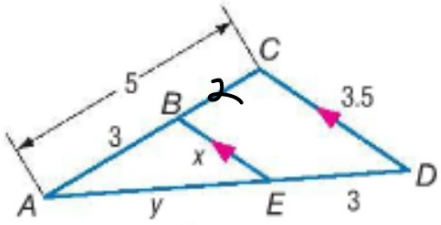
Find *BE* and *AD*.

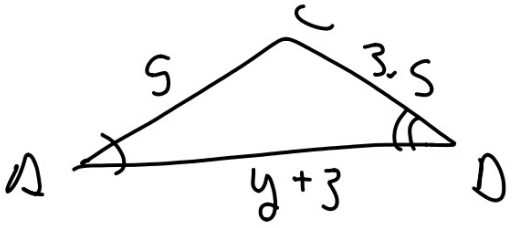
7.5



$\frac{3}{5} = \frac{y}{y+3}$

$5y = 3y + 9 \quad . y = 4.5 .$



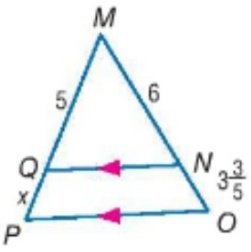


7.3 9-23 0
46-56

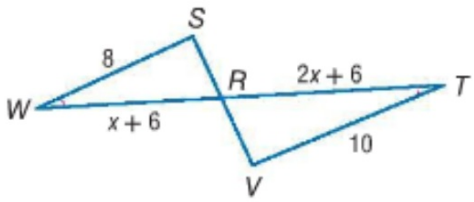
GuidedPractice

Find each measure.

4A. QP and MP



4B. WR and RT



Draw 2 separate triangles if overlap