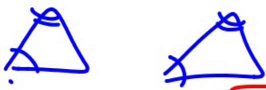


Geometry 7.3

Identify similar triangles using the AA, SAS, and SSS

Use similar triangles to solve problems

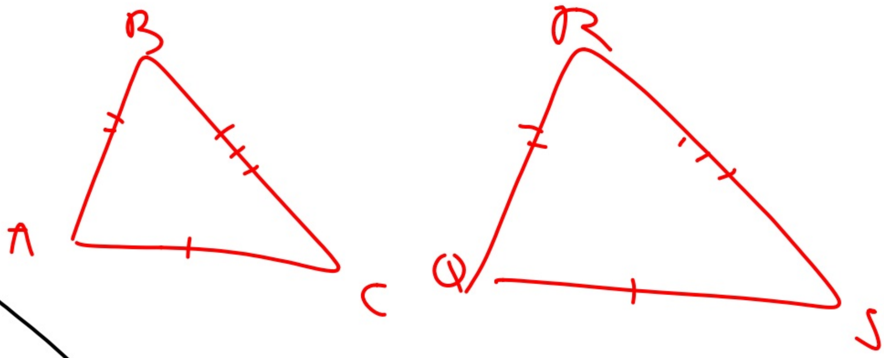
Third angle theorem

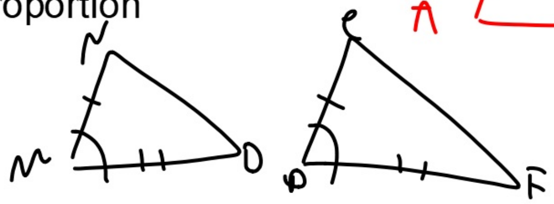
SSS

SAS (included angle)

AA

proportion



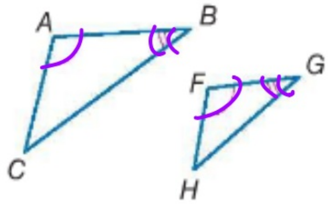


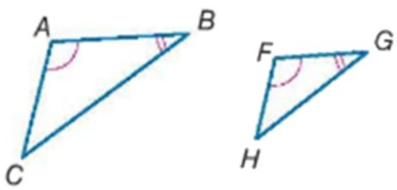
Works only for triangles

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 $\triangle ABC \sim \triangle FGH$.



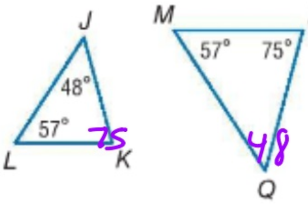


Remember: angle sum must be 180

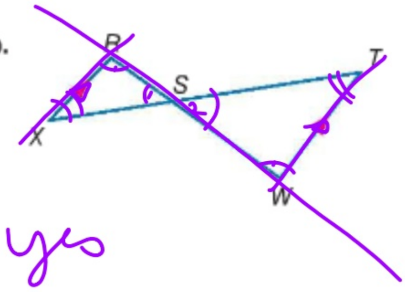
Example 1 Use the AA Similarity Postulate

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

a.



b.



yes

$\triangle JKL \sim \triangle QPM$

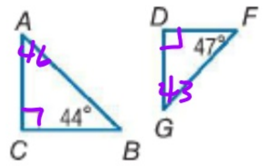
yes

$\triangle XRS \sim \triangle TWS$

$\triangle RSX \sim \triangle WST$

Guided Practice

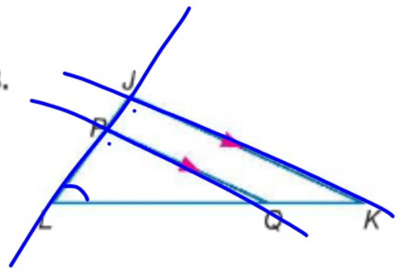
1A.

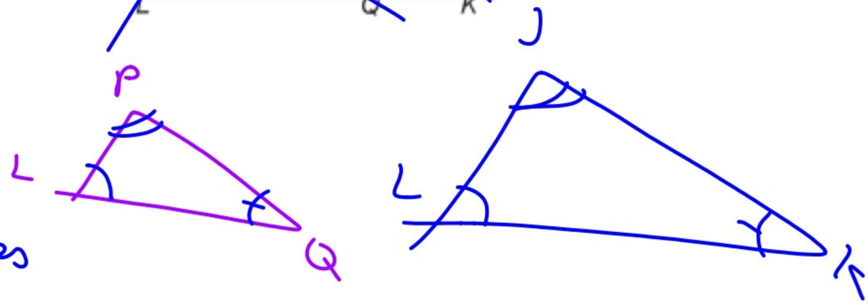


no

Corresp ∠s not ≅

1B.





Yes

$\Delta PQL \sim \Delta JKL$

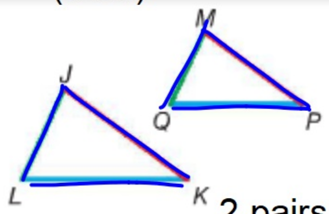
All sets of sides must be proportional
(SSS) ~

p.479

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.

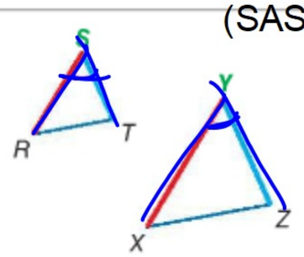
Example If $\frac{JK}{MP} = \frac{KL}{PQ} = \frac{LJ}{QM}$, then $\triangle JKL \sim \triangle MPQ$.



2 pairs of sides and INCLUDED ang
(SAS)

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 $\triangle RST \sim \triangle XYZ$.



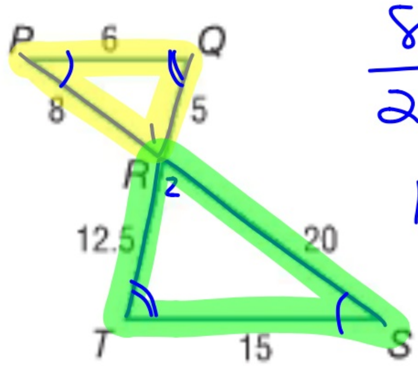
AA(A)   SSS   SAS

Example 2 Use the SSS and SAS Similarity Theorems

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

yes by SAS

a.

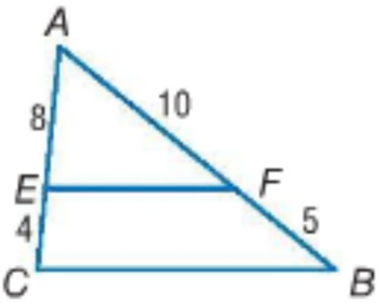


$$\frac{8}{20} \stackrel{?}{=} \frac{5}{12.5}$$

$$100 = 100$$

$\triangle PQR \sim \triangle STR$

b.



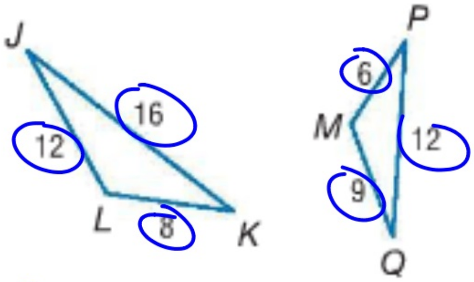
SAS, SSS

$\Delta JLK \sim \Delta QMP$

~~Guided Practice~~

yes SAS

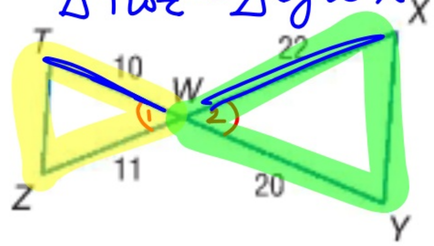
2A.



$\frac{8 \div 2}{6 \div 2}$ $\frac{12 \div 3}{9}$ $\frac{16 \div 4}{12}$ yes by SSS

$\frac{4}{3}$ $\frac{4}{3}$ $\frac{4}{3}$

2B. $\Delta TWZ \sim \Delta YWX$



$\frac{10}{20} \stackrel{?}{=} \frac{11}{22}$

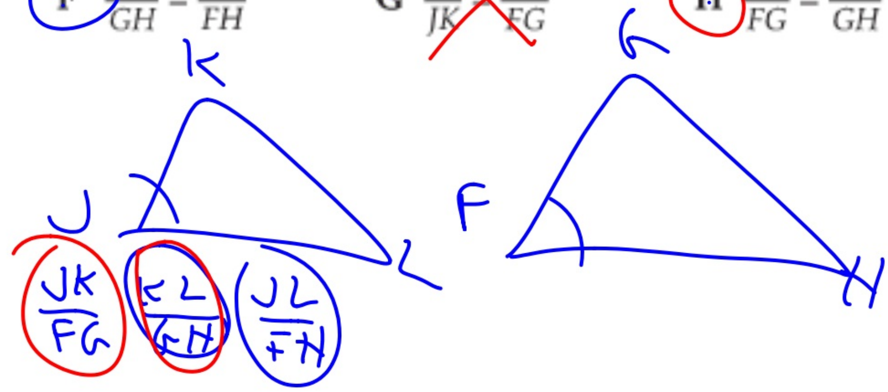
$220 = 220$

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

SAS
AA(A)

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

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



Theorem 7.4 Properties of Similarity

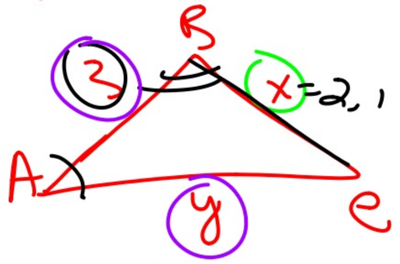
Reflexive Property of Similarity	$\triangle ABC \sim \triangle ABC$
Symmetric Property of Similarity	If $\triangle ABC \sim \triangle DEF$, then $\triangle DEF \sim \triangle ABC$.
Transitive Property of Similarity	If $\triangle ABC \sim \triangle DEF$, and $\triangle DEF \sim \triangle XYZ$, then $\triangle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

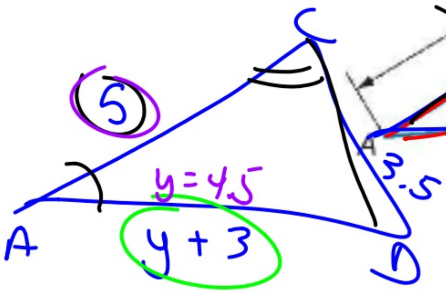
Example 4 Parts of Similar Triangles

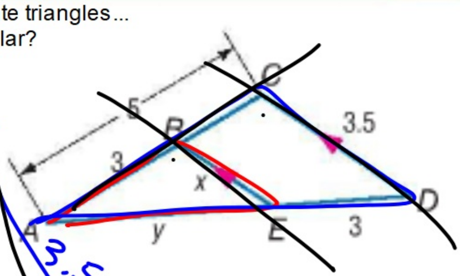
Find BE and AD. $= 7.5$

2.1

Draw separate triangles...
Are they similar?
Proportion...







$$\frac{3}{5} = \frac{x}{3.5}$$

$$\frac{5x}{5} = \frac{10.5}{5} \qquad x = 2.1$$

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

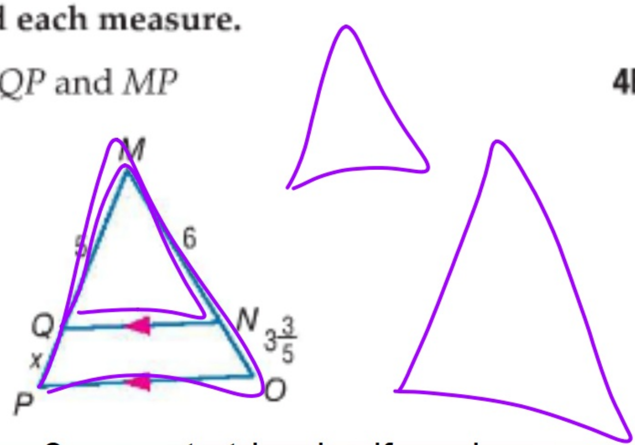
$$3y + 9 = 5y$$
$$-3y \quad -3y$$
$$9 = 2y$$

$$y = 4.5$$

GuidedPractice

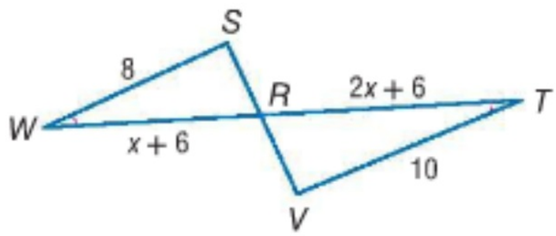
Find each measure.

4A. QP and MP



Draw 2 separate triangles if overlap

4B. WR and RT



P 483

1 - 230 ed

47 - 55 0