

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

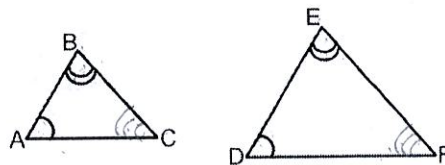
1. Angle-Angle Similarity
2. Side-Side-Side Similarity
3. Side-Angle-Side Similarity

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 $\triangle ABC \sim \triangle DEF$ BY AA~.

WHAT DO YOU KNOW ABOUT $\angle C$ AND $\angle F$? WHY?



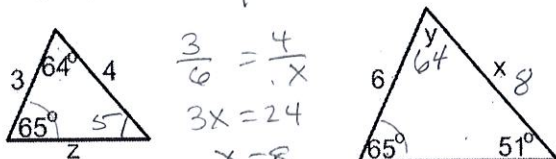
They are congruent. Triangles total 180°. Subtract the same numbers from both triangles.

What do you know about the corresponding sides? They are proportional

Why? Definition of similar triangles.

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

1. triangles similar? yes why? AA~



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

$$3x = 24$$

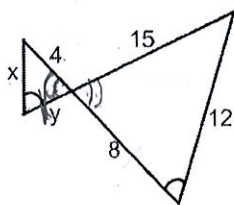
$$x = 8$$

$$x = 8 \quad y = 64 \quad z = \frac{7}{2}$$

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

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

2. triangles similar? yes why? AA~



$$x = \frac{16}{5} \quad y = \frac{32}{15}$$

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

$$\frac{4}{15} = \frac{x}{12}$$

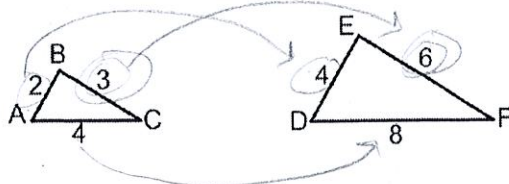
$$\frac{48}{15} = \frac{15x}{15}$$

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 $\triangle ABC \sim \triangle DEF$.

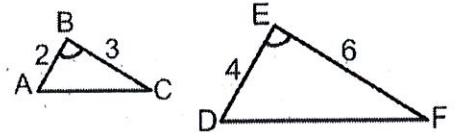
All reduce to 1/2.



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 $\frac{2}{4} = \frac{3}{6}$ and $\angle B \cong \angle E$, then $\triangle ABC \sim \triangle DEF$.



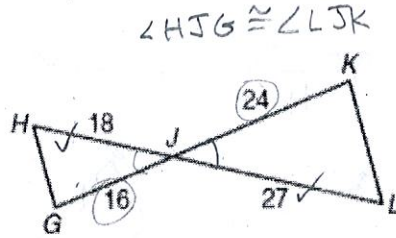
Practice! Determine if the triangles are similar. If they are, complete the similarity statement.

3. $\triangle GHJ \sim \triangle K LJ$

by SAS

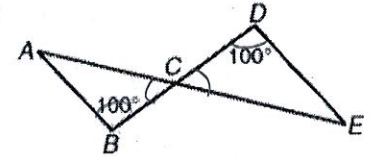
$$\frac{16}{24} = \frac{2}{3}$$

$$\frac{18}{27} = \frac{2}{3}$$



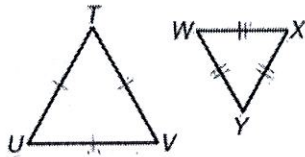
4. $\triangle ABC \sim \triangle EDC$

by AA~



5. $\triangle TUV \sim \triangle YXW$

by SSS~

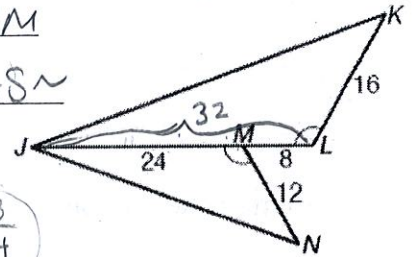


6. $\triangle JKL \sim \triangle JNM$

by SAS~

$$\frac{12}{16} = \frac{3}{4}$$

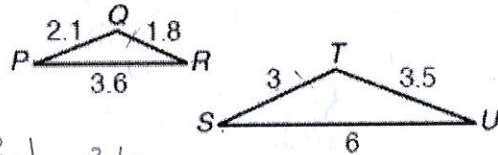
$$\frac{24}{32} = \frac{3}{4}$$



7. $\triangle PQR \sim \triangle UTS$

by SSS~

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

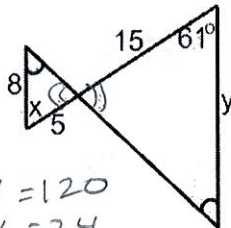


Verify that the triangles are similar, then solve for the variables.

8. $\triangle \sim \triangle \sim$

$x = 61^\circ$ $y = 24$

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



9. $\triangle \sim \triangle \sim$

$x = 3$ $y = 3.5$ $z = 48^\circ$

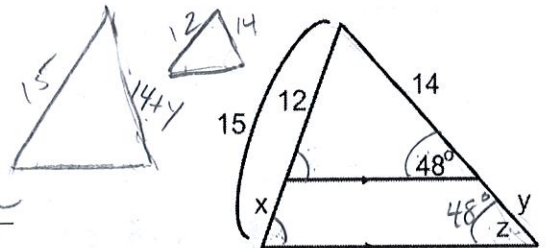
$$\frac{12}{15} = \frac{14}{14+y}$$

$$12(14+y) = (15)(14)$$

$$168 + 12y = 210$$

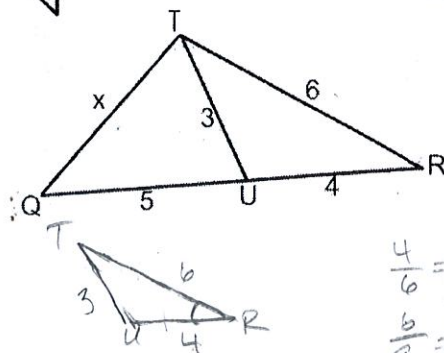
$$12y = 42$$

$$y = 3.5$$



10. $\triangle QTR \sim \triangle TUR$ by SAS~

$x = \frac{9}{2}$



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

$$\frac{6}{9} = \frac{2}{3}$$

$$\frac{4}{6} = \frac{3}{x} \quad 4x = 18$$

$$x = \frac{18}{4} = \frac{9}{2}$$

****Challenge Problem**