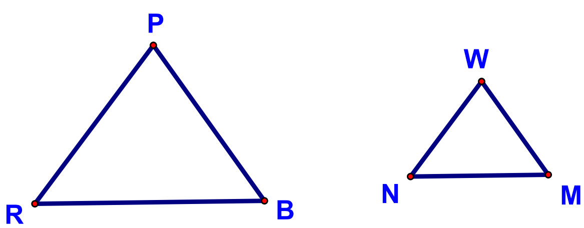
Methods of Proving Triangles Similar - Lesson 8-3

Here's the warmup!



$\triangle PRB \sim \triangle WNM$
PR = 20
RB = 22
PB = 18
WN = 12

Find NM and WM

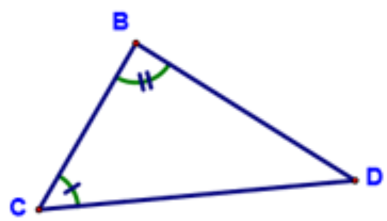
Today, we're going to look at how to prove that two triangles are similar. This is very much like proving that two triangles are congruent (remember SSS, SAS, ASA, AAS?), with the exception that there are only three shortcuts (understanding that AAA~ and AA~ are the same due to the No Choice Theorem):

Postulate:

If there exists a correspondence between the vertices of two triangles such that the three angles of one triangle are congruent to the corresponding three angles of the other triangle, then the triangles are similar (AAA ~).

Theorem 61:

If there exists a correspondence between the vertices of two triangles such that two of the angles of one triangle are congruent to the corresponding angles of the other, then the triangles are similar (AA ~).



Given: $\angle B \cong \angle F$
$\angle C \cong \angle G$

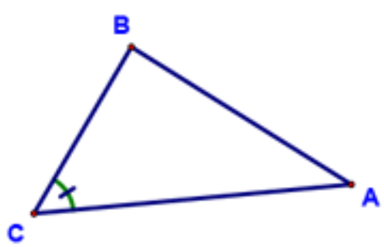
Conclusion: $\triangle BCD \sim \triangle FGH$

Theorem 62:

If there exists a correspondence between the vertices of two triangles such that the ratios of the measures of corresponding sides are equal, then the triangles are similar (SSS ~).

Theorem 63:

If there exists a correspondence between the vertices of two triangles such that the ratios of the measures of two pairs of corresponding sides are equal and the included anlges are congruent, then the triangles are similar (SAS ~).



Given: $\angle C \cong \angle G$
$$\frac{BC}{FG} = \frac{CA}{GH}$$

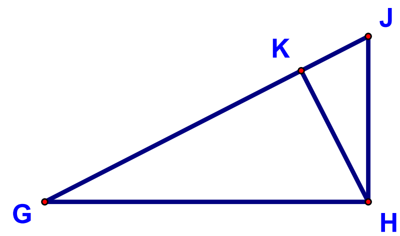
Conclusion: $\triangle ABC \sim \triangle HFG$

So AA~, SSS~ and SAS~ work for proving triangle similarity. Now, remember the key thing with similarity is having *congruent corresponding angles* and *proportional corresponding sides*. Don't get this confused with proving congruence, where you're looking for *congruent corresponding angles* and *congruent corresponding sides*!!

Here is an example I'd like you to try:

Given: $\overline{KH}$ is the altitude to hypotenuse $\overline{GJ}$ of right $\triangle GHJ$

Prove: $\triangle KHJ \sim \triangle HGJ$



Statements	Reasons