

Key

Triangles are similar if: ANGLES ARE CONGRUENT AND SIDES ARE PROPORTIONAL!!!

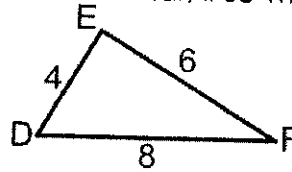
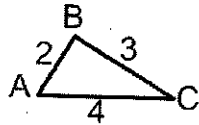
There are three ways to prove that two triangles are similar:

1. Side Side Side (SSS ~)
2. Side Angle Side (SAS ~)
3. Angle Angle (AA ~)

Side-Side-Side Similarity (SSS ~)

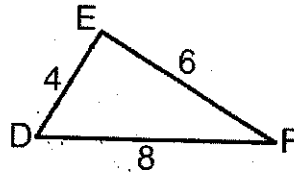
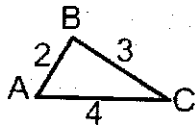
If three sides of one triangle are proportional to three corresponding sides of another triangle, then the triangles are similar.

Example: Determine if the two triangles below are similar, if so write the similarity statement



Step 1: Determine which sides match with one another

All three sides will be given to you if you are using Side Side Side, so the shortest side matches with the shortest side, the medium side matches to the medium side, and the longest side matches with the longest side.



In this case, side AB is the shortest on the first triangle and side DE is the shortest on the second triangle, so 2 matches with 4

Side BC is the medium side on the first triangle and side EF is the medium side on the second triangle, so 3 matches with 6.

Side AC is the longest side on the first triangle and side DF is the longest side on the second triangle, so 4 matches with 8.

Step 2: Find the scale factor for each pair of matching sides. (we use variable k for scale factor).

The key here is to stay consistent with your pairings!

Short Side:

2 matches with 4, so the scale factor $k = \frac{2}{4}$; simplified is $\frac{1}{2}$ (USE YOUR CALCULATOR TO SIMPLIFY!!!)

Medium Side:

3 matches with 6, so the scale factor $k = \frac{3}{6}$; simplified is $\frac{1}{2}$

Long Side:

4 matches with 8, so the scale factor $k = \frac{4}{8}$; simplified is $\frac{1}{2}$

If the scale factor k is the same for all sides, then the triangle is similar by SSS~

Step 3: Determine if the triangles are similar

If the scale factor k is the same for all sides, then the triangle is similar by Side Side Side Similarity
In our example, the simplified k was $\frac{1}{2}$ for all sides, therefore these triangles are similar by SSS~

Step 4: Write the similarity statement

The order must be correct for your similarity statement to be correct. In our case, AB and DE were the shortest sides, so they must be in the same spot in the statement

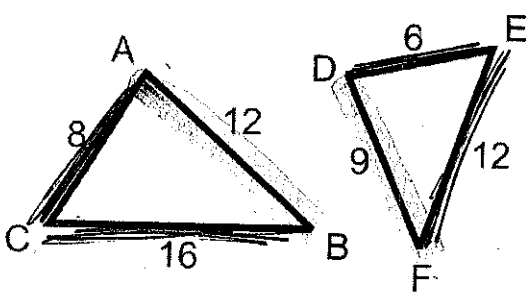
$$\triangle ABC \sim \triangle DEF.$$

By default, the last letter must be C for the first triangle and F for the second, but we can check our work and make sure that is correct based on our matching for step 1:

$\triangle ABC \sim \triangle DEF$. BC and EF were both matched as our medium sides

$\triangle ABC \sim \triangle DEF$. AC and DF were both matched as our longest sides.

Now you try: Determine if the triangles below are similar, and if so, write the scale factor that proves it and the similarity statement



Step 1: Match sides

Shortest \rightarrow green \rightarrow AC & DE

~~longest~~
medium \rightarrow purple \rightarrow BC & EF

~~longest~~
medium \rightarrow orange \rightarrow AB & DF

Step 2: Scale factor

$$\frac{AC}{DE} = \frac{8}{6} = \frac{4}{3}$$

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

$$\frac{AB}{DF} = \frac{12}{9} = \frac{4}{3}$$

Step 3:

Yes, similar

Step 4: Name $\triangle ABC \sim \triangle DEF$ by SSS ~