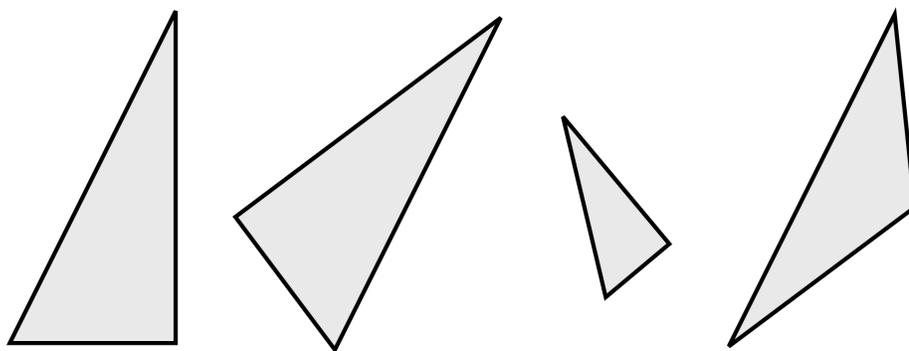


Congruence of triangle

According to Wikipedia, two figures are “congruent,” if they have the same shape and size, or if one has the same shape and size as the mirror image of the other. In other words, two figures on a piece of paper are congruent, if they can be cut out and be overlapped each other completely. Turning the paper over is allowed. Two figures are “similar,” if they have the same shape, or if one has the same shape as the mirror image of the other. See the figure below.



The two left triangles are congruent, and the third is similar to both of them. However, the last one is neither congruent nor similar to the other ones.

Problem 1. If two figures are congruent, are they similar as well? Explain.

There are simple ways to check whether two triangles are congruent. We list three of them.

First, SSS (Side-Side-Side). If the three sides of $\triangle ABC$ (i.e. \triangle here means triangle) have the same lengths as the three sides of $\triangle DEF$, $\triangle ABC$ and $\triangle DEF$ are congruent. It is easy to see this, if you think about how you draw a triangle when you are provided with the lengths of three sides. You are guaranteed to draw the same triangle once you are provided with the same three sides.

Second, SAS (Side-Angle-Side). If two sides of $\triangle ABC$ and the angle between the two sides are the same as the two sides of $\triangle DEF$ and the angle between the two sides, $\triangle ABC$ and $\triangle DEF$ are congruent. Again, it is easy to see this, if you think about how you draw a triangle when you are provided with SAS.

Third, ASA (Angle-Side-Angle). If one side of $\triangle ABC$ and the two angles adjacent to it are same as one side of $\triangle DEF$ and the two angles adjacent to it, $\triangle ABC$ and $\triangle DEF$ are congruent. Again, it is easy to see this, if you think about how you draw a triangle when you are provided with ASA.

Summary

- Two figures are “congruent,” if they have the same shape and size, or if one has the same shape and size as the mirror image of the other.
- Two figures are “similar,” if they have the same shape, or if one has the same shape as the mirror image of the other.
- Two triangles are congruent if one of the following three criteria is satisfied: SSS (Side-Side-Side), SAS (Side-Angle-Side), ASA (Angle-Side-Angle).

(The figure is from https://commons.wikimedia.org/wiki/File:Congruent_non-congruent_triangles.svg)