

Task. Can right triangles with proportional sides have angles that are not congruent and therefore not be similar?

Solution. Recall that two triangles ABC and $A'B'C'$ are called similar if they have proportional sides, i.e.

$$\frac{AB}{A'B'} = \frac{AC}{A'C'} = \frac{BC}{B'C'}.$$

There is also a theorem from geometry claiming that *two similar triangles ABC and $A'B'C'$ have equal corresponding angles, i.e.*

$$\angle A = \angle A', \quad \angle B = \angle B', \quad \angle C = \angle C'.$$

In our case we have right triangles with proportional sides. Then by definition these triangles are similar. It does not matter whether they are right or not. Hence by theorem above, these triangles have equal corresponding angles.

Thus the answer to the question is "No".