

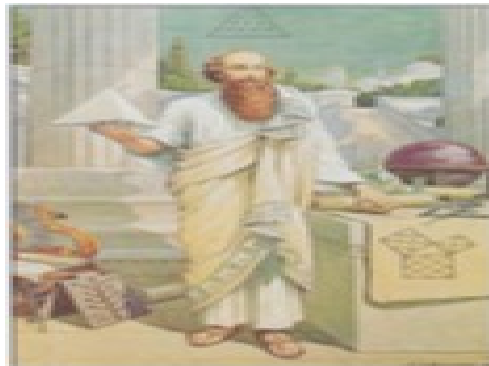
Similarity

Definition: Two shapes are **similar** if their **corresponding angles are equal** and if their **corresponding sides have the same ratio**.

Similarity is related to enlarging (or shrinking) a photograph – everything must be kept in *proportion* or it doesn't look very good.



similar



not similar

Similarity is preserved under rotation & reflection.



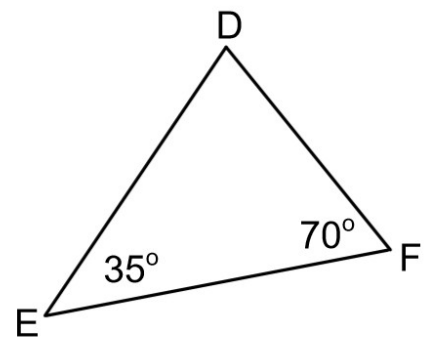
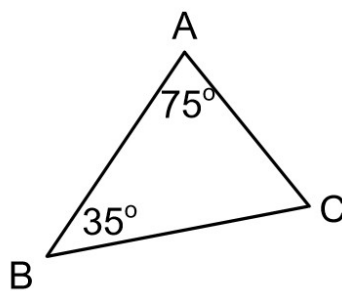
(still similar!)

How to check for similarity

1. Verify that all corresponding angles are the same. (This may require using angle properties!)

Each triangle shown has two angles labeled. Since $\angle B$ and $\angle E$ match, it's worth figuring out the missing angles to see if there are other matches.

$$\begin{aligned}\angle C &= 180 - 75 - 35 = 70 \\ \angle D &= 180 - 35 - 70 = 75\end{aligned}$$



Since $\angle A = \angle D$, $\angle B = \angle E$, and $\angle C = \angle F$, we can say that ABC is similar to DEF ($ABC \sim DEF$).

It is sufficient to show that **two** angles in a triangle are the same.

2. Verify the ratios of corresponding sides.

The sides correspond based on their sizes. (For example, AC corresponds to DF because they are the shortest side in each triangle.)

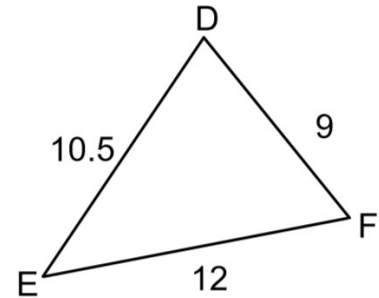
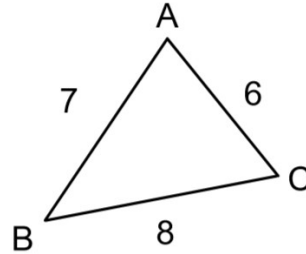
$$\frac{DF}{AC} = \frac{9}{6} = 1.5$$

Side DF is 1.5 times bigger than side AC. We check the other sides to verify:

$$\frac{EF}{BC} = \frac{12}{8} = 1.5$$

$$\frac{DE}{AB} = \frac{10.5}{7} = 1.5$$

Thus ABC is similar to DEF.



Definition: Two triangles are **congruent** if they are similar **and** the corresponding sides are the **same** length. Congruence is essentially the same as being equal.

Practice: pg. 378 # 1 – 5