

Similar and Congruent Figures

Recall...

	Corresponding angles are...	Corresponding side lengths are...
In congruent figures	all equal	all equal
In similar figures	all equal	proportional (ratios are all equal)

Two triangles can be proven **congruent** using any of these five conditions:

Condition	Meaning
SSS	Three pairs of equal corresponding sides
SAS	Two pairs of equal sides with the angle between them equal
ASA	Two pairs of equal angles with the side between them equal
AAS	Two pairs of equal angles and one pair of equal non-contained sides
HS	Equal hypotenuses and one pair of equal legs (right triangles only)

1. For each pair of triangles, state whether they are **congruent**, **similar but not congruent**, or **neither**. If congruent, name the condition (SSS, SAS, ASA, AAS, or HS).

a)

$\triangle ABC$ has sides $AB = 5$, $BC = 7$, $CA = 9$.

$\triangle DEF$ has sides $DE = 10$, $EF = 14$, $FD = 18$.

b)

$\triangle PQR$ has $PQ = 6$, $\angle P = 42^\circ$, $PR = 8$.

$\triangle XYZ$ has $XY = 6$, $\angle X = 42^\circ$, $XZ = 8$.

c)

$\triangle GHI$ has $\angle G = 55^\circ$, $\angle H = 75^\circ$, $GH = 12$.

$\triangle JKL$ has $\angle J = 55^\circ$, $\angle K = 75^\circ$, $JK = 12$.

2. The two triangles below are **similar**. Find the value of x .

$\triangle ABC$ has sides $AB = 4$, $BC = x$, $CA = 6$.

$\triangle DEF$ has sides $DE = 10$, $EF = 15$, $FD = 15$.

HINT: Drawing a rough diagram may help you build the ratio of similarity.

3. A student wants to estimate the height of a flagpole.

She holds a metre stick vertically, and it casts a shadow 0.8 m long at the same time the flagpole casts a shadow 6.4 m long.

The two triangles formed (metre stick + its shadow, flagpole + its shadow) are **similar**.

Find the height of the flagpole.

$$\frac{\text{height of metre stick}}{\text{height of flagpole}} = \frac{\text{shadow of metre stick}}{\text{shadow of flagpole}}$$