GCSE Maths – Geometry and Measures

Congruent Triangles

Worksheet

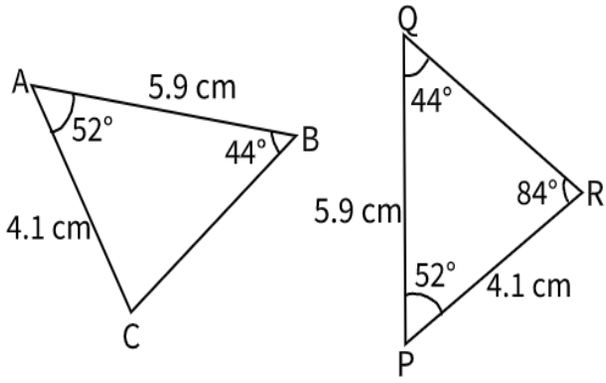
WORKED SOLUTIONS

This worksheet will show you how to work out questions relating to congruent triangles questions. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

Are triangles ABC and PQR congruent? Explain your answer.



Step 1: Draw similarities between triangles ABC and PQR.

$$\angle CAB = 52°$$
$$\angle QPR = 52°$$

So,

$$\angle CAB = \angle QPR$$

$$\angle ABC = 44°$$
$$\angle PQR = 44°$$

So,

$$\angle ABC = \angle PQR$$

$$AB = 5.9\ cm,$$
$$PQ = 5.9\ cm$$

So,

$$AB = PQ$$

Step 2: Use the information to decide if you can prove any of the four conditions for congruency.

We have deduced that the triangles have two pairs of angles which are equal:

$$\angle CAB = \angle QPR$$
$$\angle ABC = \angle PQR$$

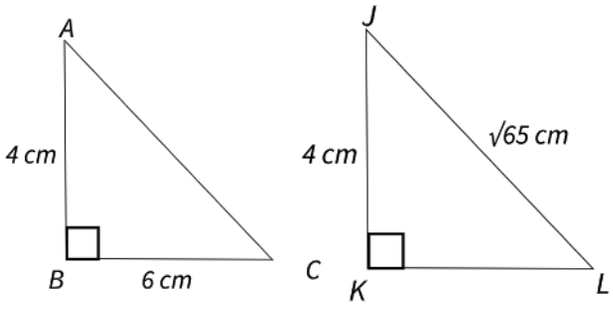
*We have shown the corresponding side **between** the angles is the same:*

$$AB = PQ$$

*Therefore, the condition **ASA** has been met. The triangles are **congruent**.*

Guided Example

Are triangles ABC and JKL congruent? Explain your answer.



Step 1: Draw similarities between triangles ABC and JKL, calculating the length of side AC so the longest sides can be compared.

R Both triangles have right angles.

H For ABC : $a^2 + b^2 = c^2$

$4^2 + 6^2 = c^2$

$16 + 36 = c^2$

$52 = c^2$

$c = \sqrt{52}$ cm

For JKL : $c = \sqrt{65}$ cm

S : AB = JK (4 cm)

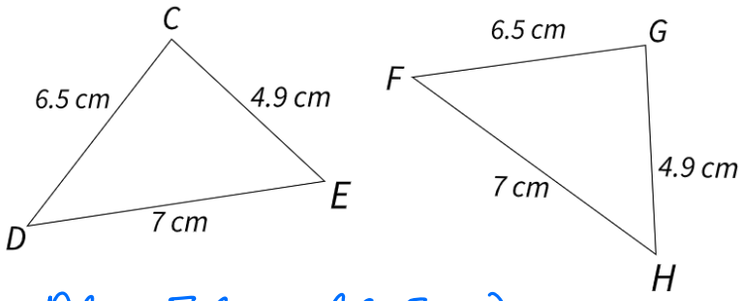
Step 2: Use the information to decide if you can prove the RHS condition for congruence.

The triangles aren't congruent because the hypotenuse is not equal. Therefore we cannot prove congruence by RHS.

Now it's your turn!
If you get stuck, look back at the worked and guided examples.

1. Are the following sets of triangles congruent? Explain your answer.

a)



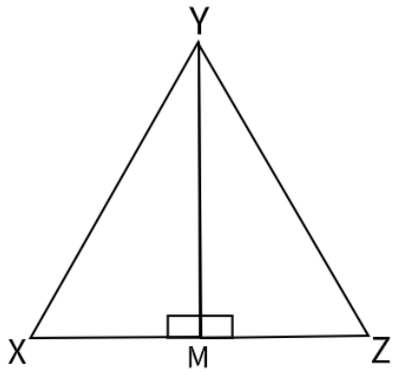
S DC = FG (6.5 cm)

S DE = FH (7 cm)

S CE = GH (4.9 cm)

The triangles are congruent by SSS.

b) Triangles XYM and YMZ



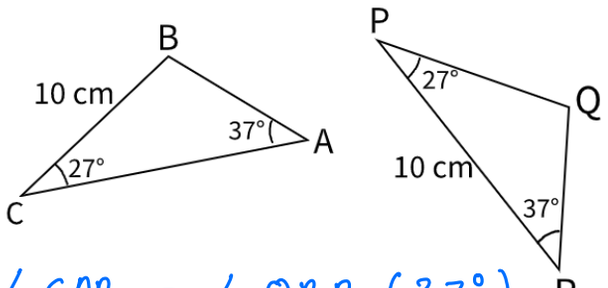
S: Both triangles share side YM

A: $\angle XMY = \angle ZMY = 90°$

S: We do not have enough information to prove XM = MZ

The triangles may not be congruent.

c)



A: $\angle CAB = \angle QRP$ (37°)

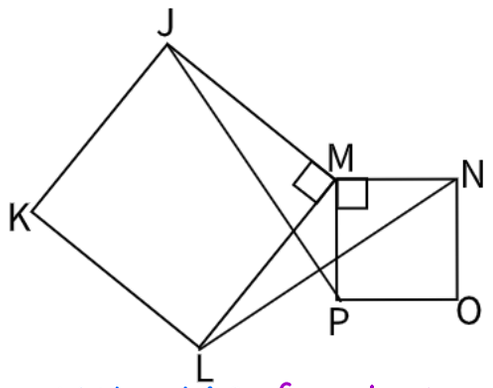
A: $\angle ACB = \angle QPR$ (27°)

S: In $\triangle ABC$, the 10cm is opposite Angle 37°.
In $\triangle PQR$, the 10cm is between angles 27° and 37°

Therefore we cannot prove congruence by ASA.

The triangles aren't congruent.

d) Given $JKLM$ and $MNOP$ are squares, Triangles JPM and LMN



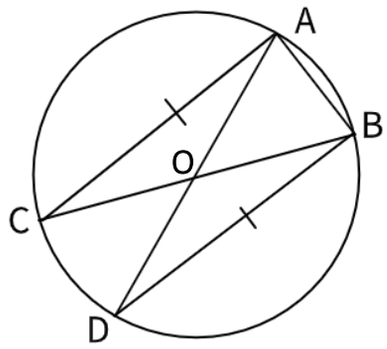
S: MN = MP (equal sides in a square)

A: $\angle JMP = \angle LMN$ (both are 90° + $\angle LMP$)

S: LM = JM (equal sides in larger square).

By SAS, the triangles are congruent.

e) Triangles AOC and BOD



A : $\angle ACB = \angle BDA$ (angles in same segment)

S : $AC = DB$ (we are told)

A : $\angle CAD = \angle DBC$ (angles in same segment)

By ASA, $\triangle AOC$ and $\triangle BOD$ are congruent.