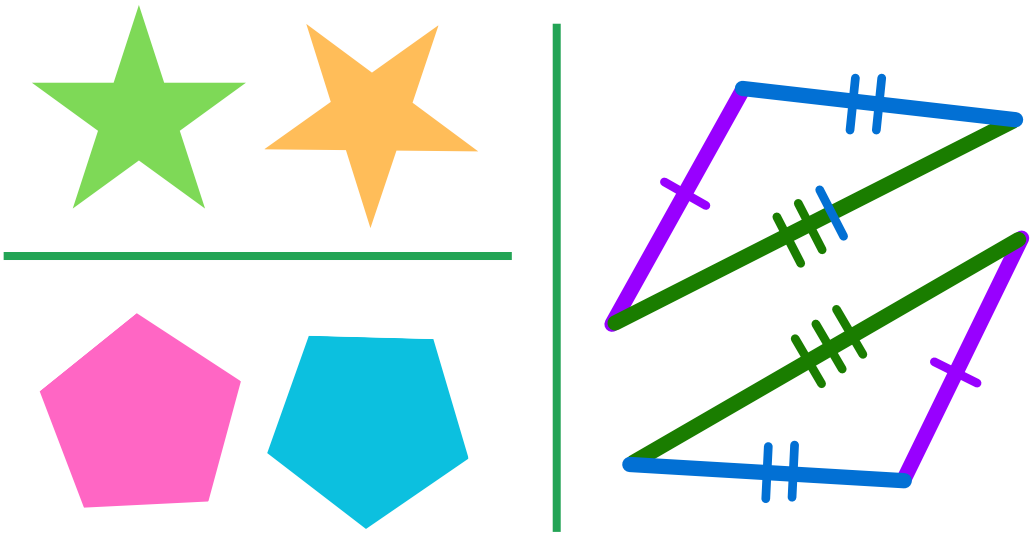
Congurence - GCSE Maths

Contents

1. Introduction

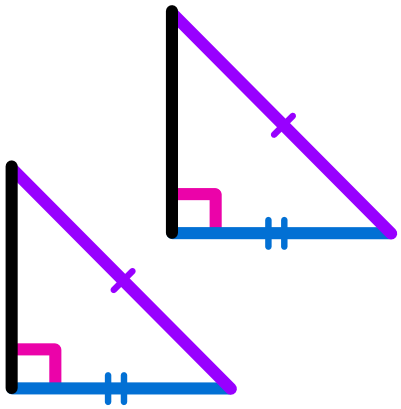
- **Congruent shapes** are those which have the **same shape and size.** These shapes can be rotated to look different but remain congruent.
- The Congruent shapes if are reflections (**mirror image**) of each other they might look very different.



2. Congruent Triangles

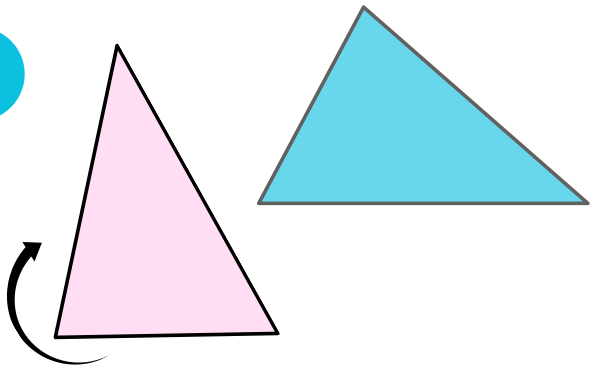
- Congruent Triangles are those which are **same in size and shape** but their orientation maybe different.
- Examples -

1



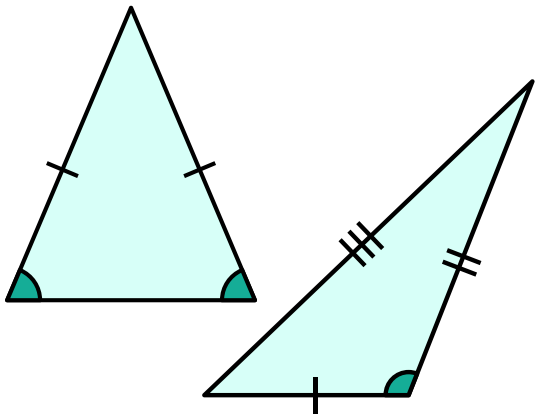
Congruent Triangles
(due to the same shape and size)

2



Congruent Triangles
(different orientation but same shape and size)

3



Not Congruent
(shape and size are different)

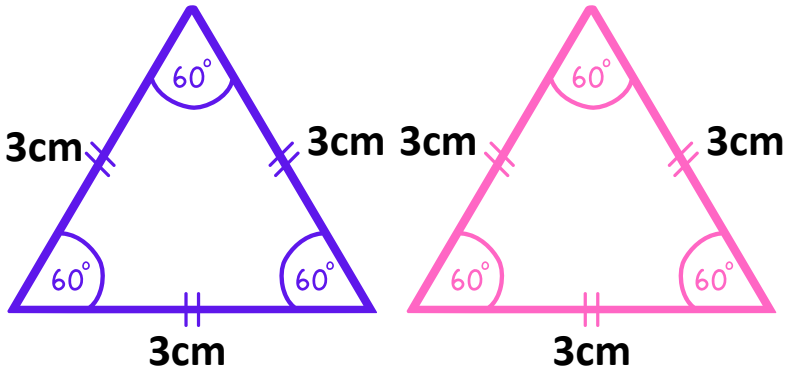
3. Congruent Triangle Rules

- We cannot always tell by just seeing the Triangles that they are congruent or not. Thus we have following **Rules** and by learning them we can easily detect the Congruent Triangles.

S - Side
A - Angle
R - Right Angle
H - Hypotenuse

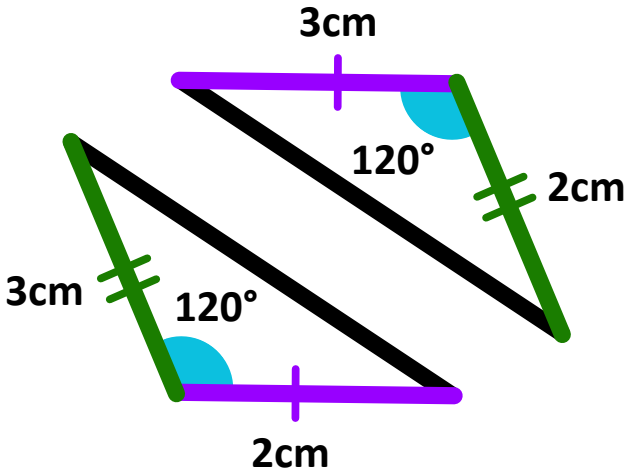
1. SSS

All sides are equal in length



2. SAS

When two sides and the angle between them is same in both the triangles



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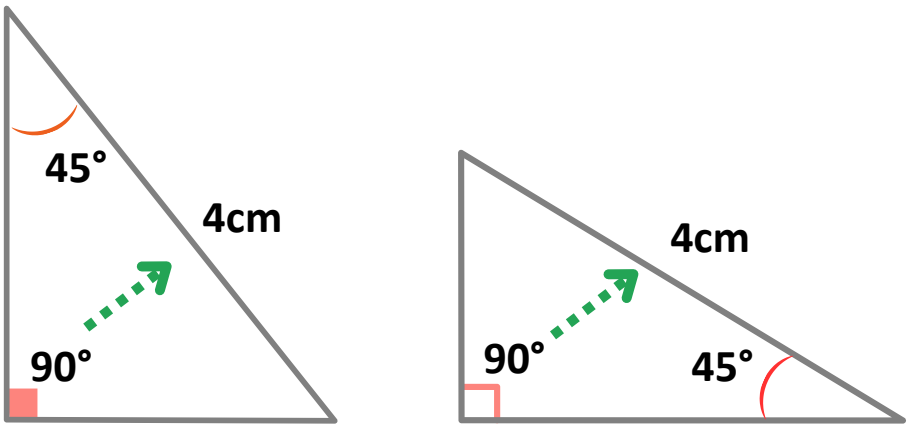
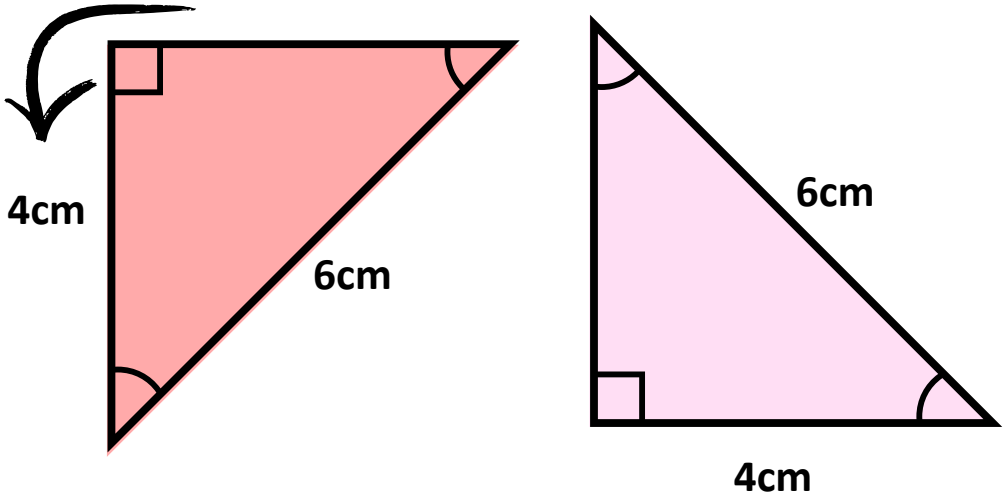
3.AAS

Two Angles are same and one side is equal in both triangles at the same place with respect to these two equal angles



4.RHS

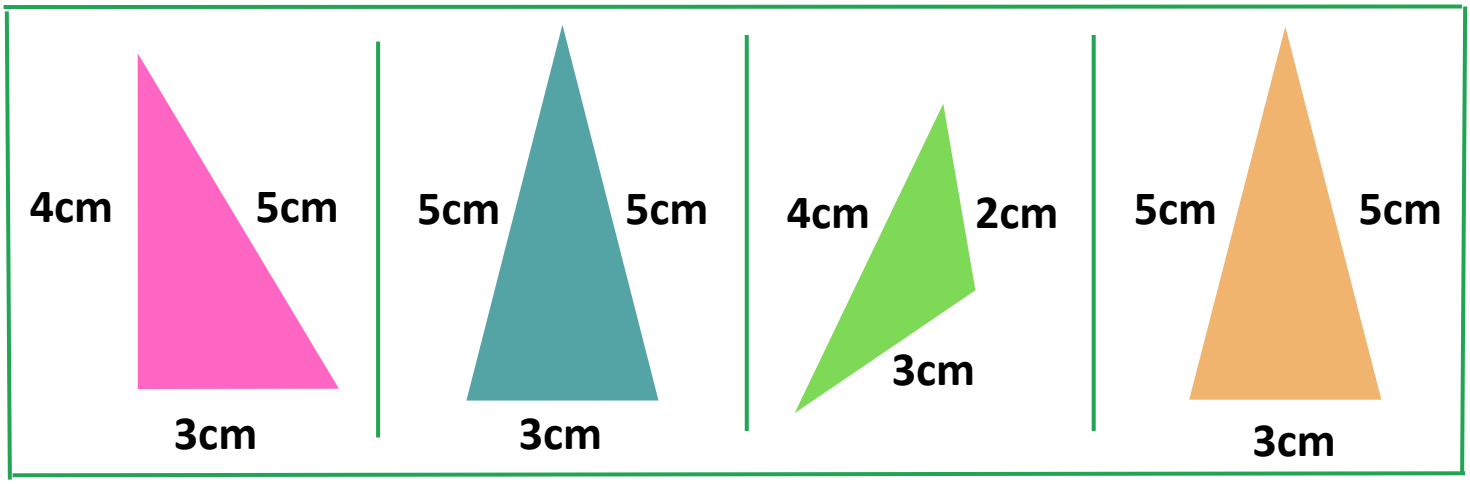
When one of the angles is Right angle and Hypotenuse lengths are same along with one equal side



4. Solved Examples

(1) Detect the congruent triangles among the following triangles?

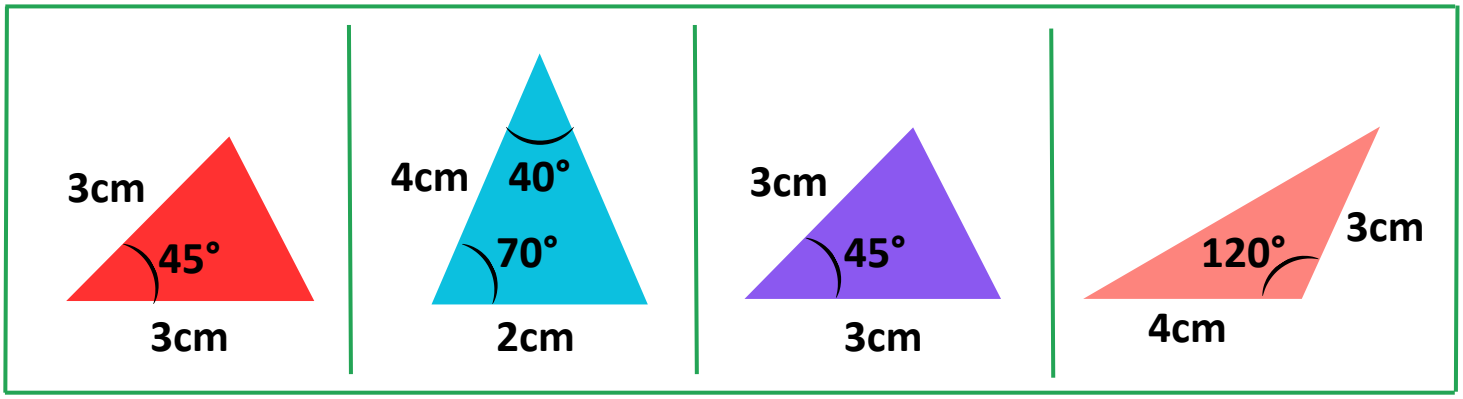
A



(1) **(2)** **(3)** **(4)**

Answer: 2nd and 4th Triangles are Congruent (by SSS).

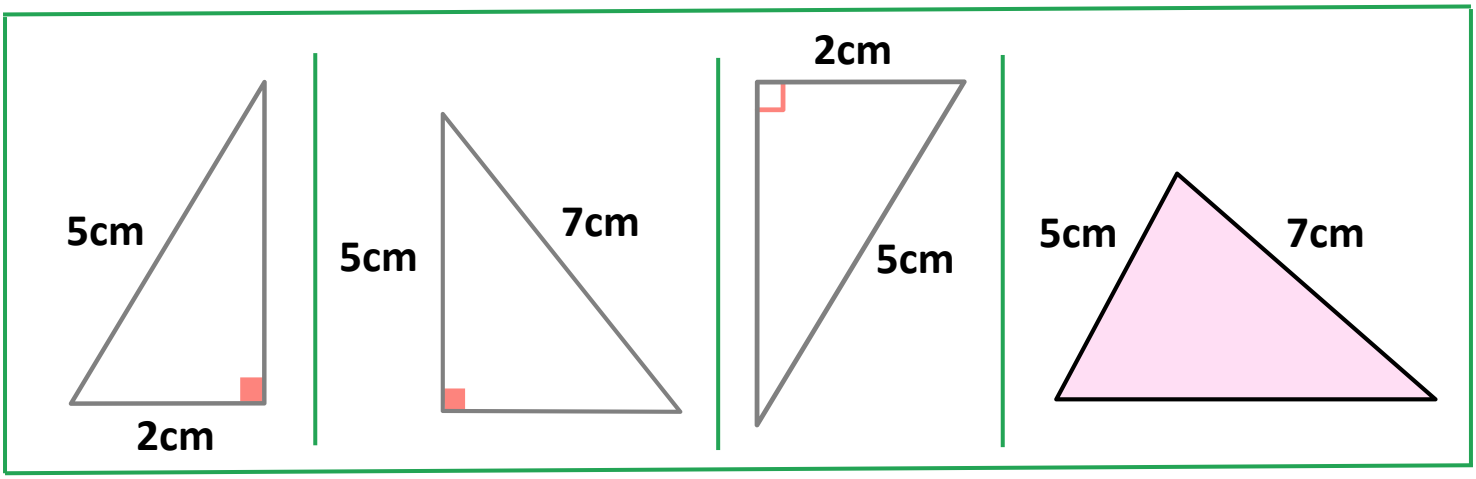
B



(1) **(2)** **(3)** **(4)**

Answer: 1st and 3rd Triangles are Congruent (by SAS).

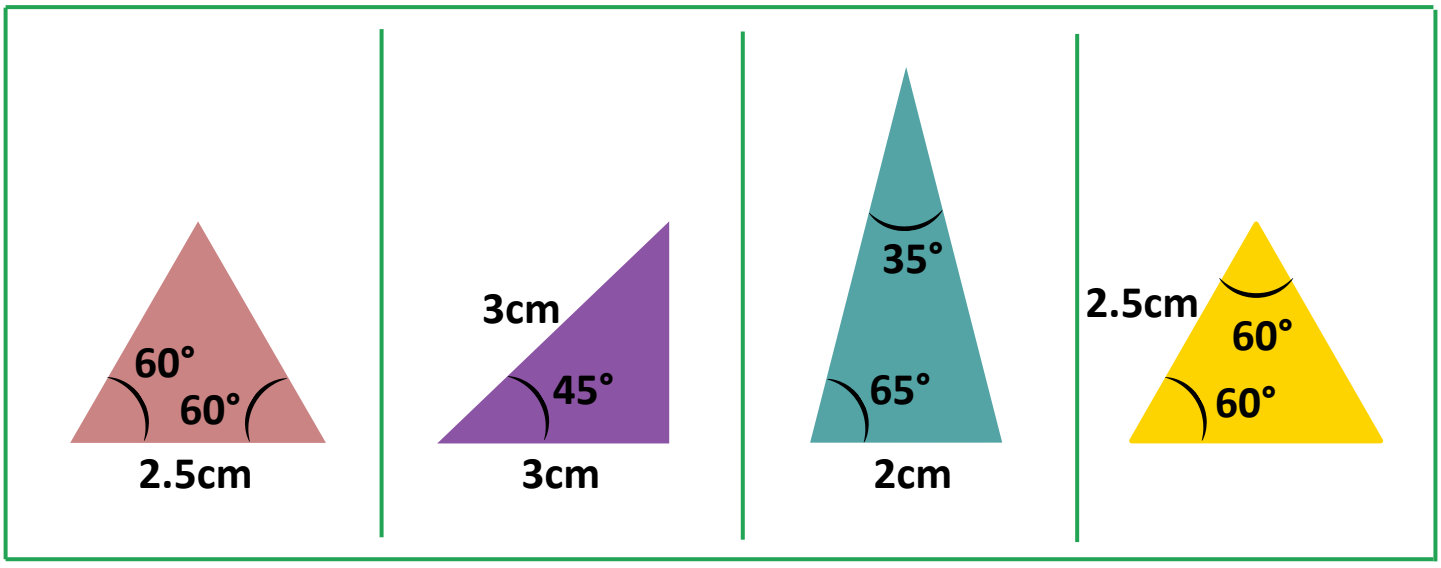
C



(1) (2) (3) (4)

Answer: 1st and 3rd Triangles are Congruent (by RHS) their orientation is different but still size and shape is same.

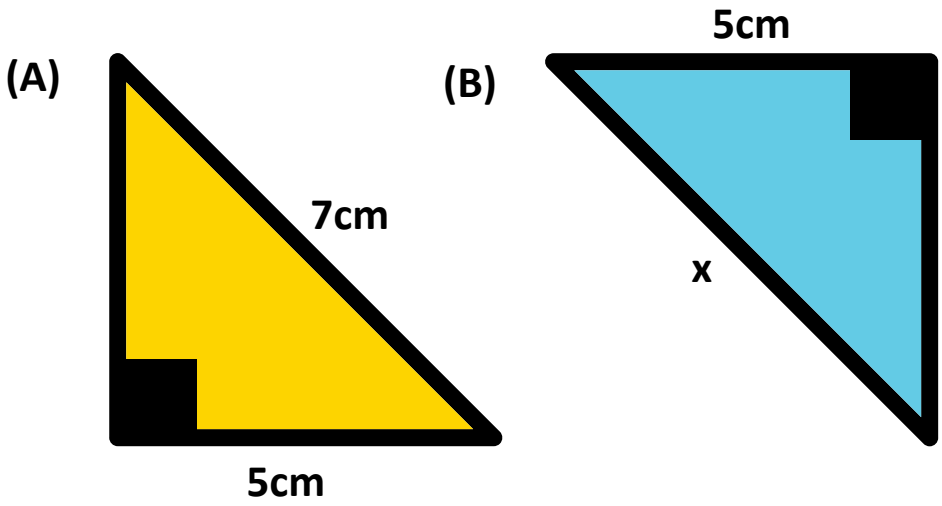
D



(1) (2) (3) (4)

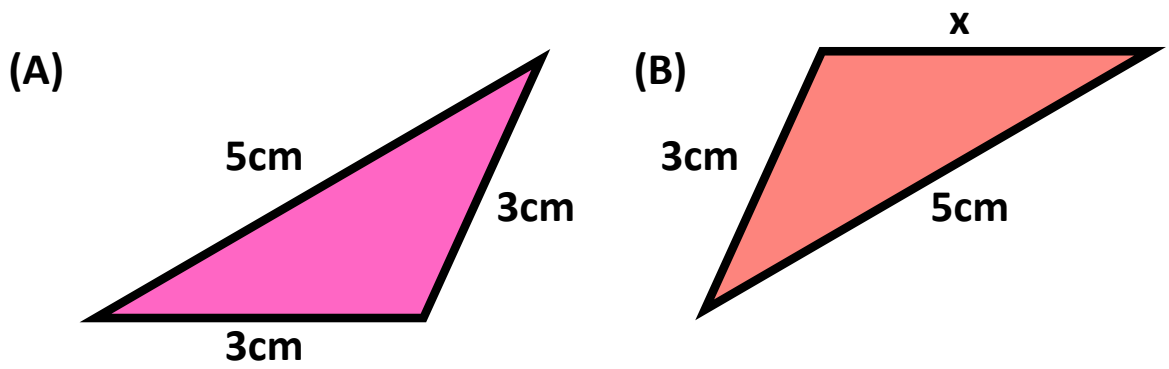
Answer: 1st and 4th Triangles are Congruent (by AAS) their orientation is different but still size and shape is same.

(2) Given that the following Triangles are congruent, then find out the missing side in the triangle B?



Solution: The above triangles are congruent by the rule RHS as both the triangles are right angle triangles and two sides are equal one of them being hypotenuse. the second triangle's hypotenuse is equal to the hypotenuse of the first triangle. Thus, **x = 7cm**

(3) Given that the following Triangles are congruent, then find out the missing side in the triangle A?



Solution: The triangles are congruent by the rule SSS means the sides are equal. Thus, **x = 3cm**.