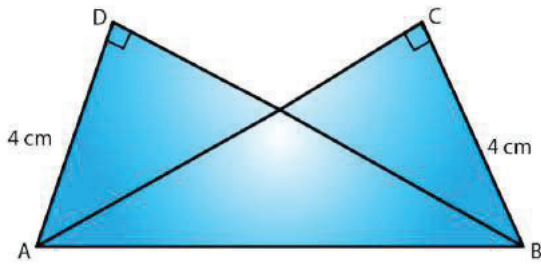
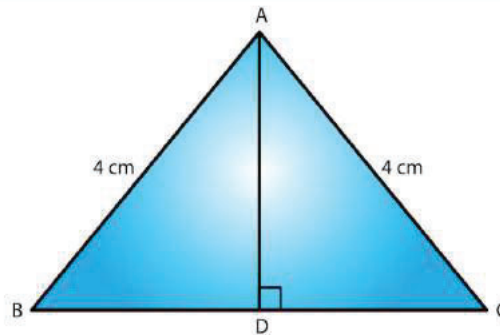


EXERCISE 16.5

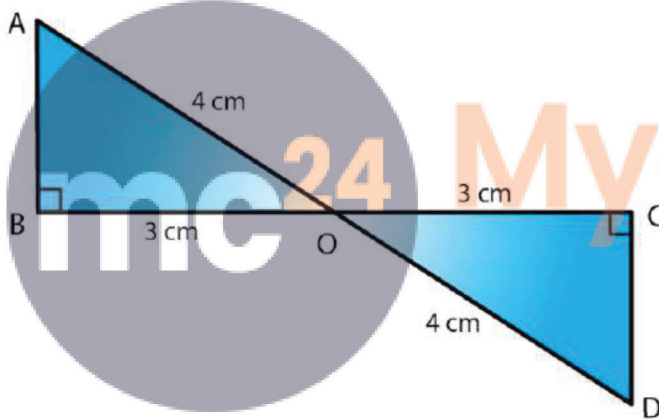
1. In each of the following pairs of right triangles, the measures of some parts are indicated alongside. State by the application of RHS congruence condition which are congruent, and also state each result in symbolic form. (Fig. 46)



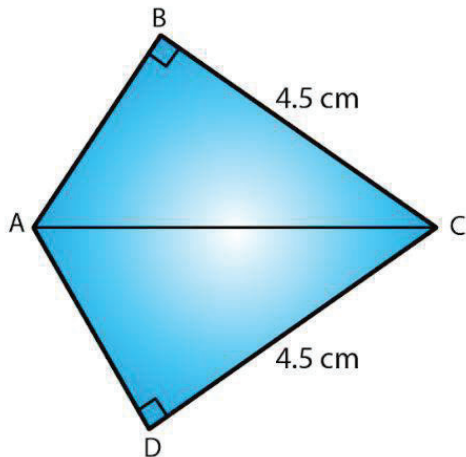
(i)



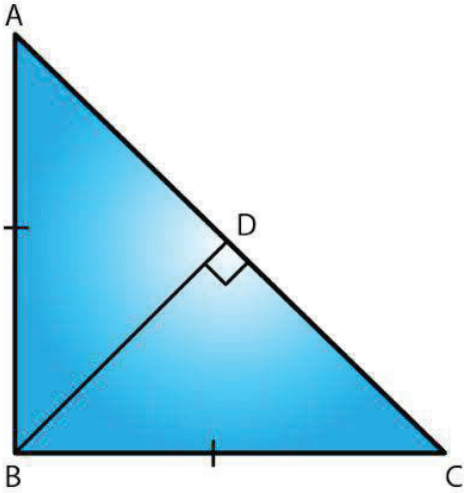
(ii)



(iii)



(iv)



(v)

Fig. 46

**Solution:**

(i)  $\angle ADB = \angle BCA = 90^\circ$

$AD = BC$  and hypotenuse  $AB = \text{hypotenuse } AB$

Therefore, by RHS  $\triangle ADB \cong \triangle ACB$

(ii)  $AD = AD$  (Common)

Hypotenuse  $AC = \text{hypotenuse } AB$  (Given)

$\angle ADB + \angle ADC = 180^\circ$  (Linear pair)

$\angle ADB + 90^\circ = 180^\circ$

$\angle ADB = 180^\circ - 90^\circ = 90^\circ$

$\angle ADB = \angle ADC = 90^\circ$

Therefore, by RHS  $\triangle ADB \cong \triangle ADC$

(iii) Hypotenuse  $AO = \text{hypotenuse } DO$

$BO = CO$

$\angle B = \angle C = 90^\circ$

Therefore, by RHS,  $\triangle AOB \cong \triangle DOC$

(iv) Hypotenuse  $AC = \text{Hypotenuse } CA$

$BC = DC$

$\angle ABC = \angle ADC = 90^\circ$

Therefore, by RHS,  $\triangle ABC \cong \triangle ADC$

(v)  $BD = DC$

Hypotenuse AB = Hypotenuse BC, as per the given figure,

$$\angle BDA + \angle BDC = 180^\circ$$

$$\angle BDA + 90^\circ = 180^\circ$$

$$\angle BDA = 180^\circ - 90^\circ = 90^\circ$$

$$\angle BDA = \angle BDC = 90^\circ$$

Therefore, by RHS,  $\triangle ABD \cong \triangle CBD$

**2.  $\triangle ABC$  is isosceles with  $AB = AC$ .  $AD$  is the altitude from  $A$  on  $BC$ .**

**(i) Is  $\triangle ABD \cong \triangle ACD$ ?**

**(ii) State the pairs of matching parts you have used to answer (i).**

**(iii) Is it true to say that  $BD = DC$ ?**

**Solution:**

(i) Yes,  $\triangle ABD \cong \triangle ACD$  by RHS congruence condition.

(ii) We have used Hypotenuse AB = Hypotenuse AC

$$AD = DA$$

$$\angle ADB = \angle ADC = 90^\circ \text{ (AD } \perp \text{ BC at point D)}$$

(iii) Yes, it is true to say that  $BD = DC$  (corresponding parts of congruent triangles)

Since we have already proved that the two triangles are congruent.

**3.  $\triangle ABC$  is isosceles with  $AB = AC$ . Also.  $AD \perp BC$  meeting  $BC$  in  $D$ . Are the two triangles  $ABD$  and  $ACD$  congruent? State in symbolic form. Which congruence condition do you use? Which side of  $\triangle ADC$  equals  $BD$ ? Which angle of  $\triangle ADC$  equals  $\angle B$ ?**

**Solution:**

We have  $AB = AC$  ..... (i)

$AD = DA$  (common) ..... (ii)

And,  $\angle ADC = \angle ADB$  ( $AD \perp BC$  at point  $D$ ) ..... (iii)

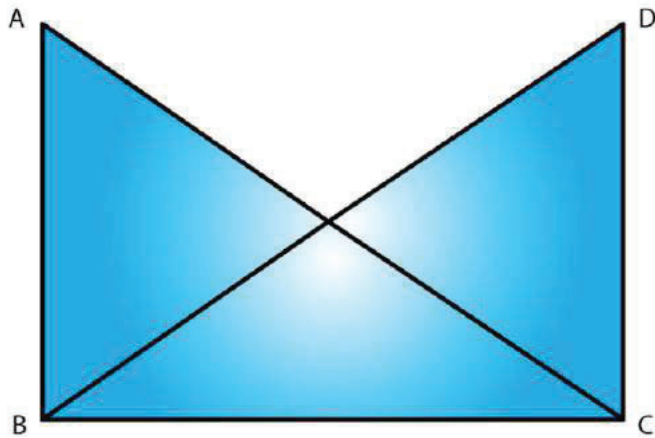
Therefore, from (i), (ii) and (iii), by RHS congruence condition,  $\triangle ABD \cong \triangle ACD$ , the triangles are congruent.

Therefore,  $BD = CD$ .

And  $\angle ABD = \angle ACD$  (corresponding parts of congruent triangles)

**4. Draw a right triangle  $ABC$ . Use RHS condition to construct another triangle congruent to it.**

**Solution:**



Consider

$\triangle ABC$  with  $\angle B$  as right angle.

We now construct another triangle on base  $BC$ , such that  $\angle C$  is a right angle and  $AB = DC$

Also,  $BC = CB$

Therefore by RHS,  $\triangle ABC \cong \triangle DCB$

5. In fig. 47,  $BD$  and  $CE$  are altitudes of  $\triangle ABC$  and  $BD = CE$ .

(i) Is  $\triangle BCD \cong \triangle CBE$ ?

(ii) State the three pairs or matching parts you have used to answer (i)

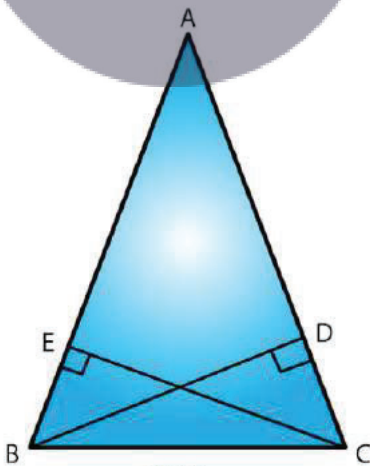


Fig. 47

**Solution:**

(i) Yes,  $\triangle BCD \cong \triangle CBE$  by RHS congruence condition.

(ii) We have used hypotenuse  $BC =$  hypotenuse  $CB$

BD = CE (Given in question)  
And  $\angle BDC = \angle CEB = 90^\circ$



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