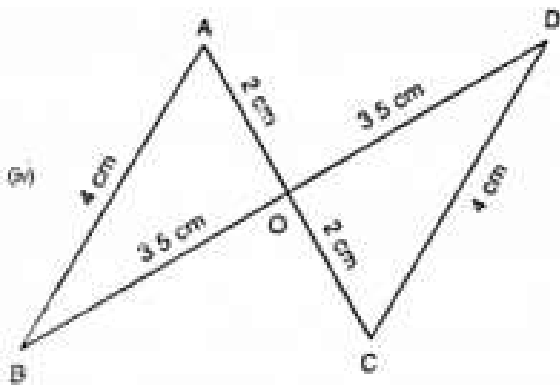
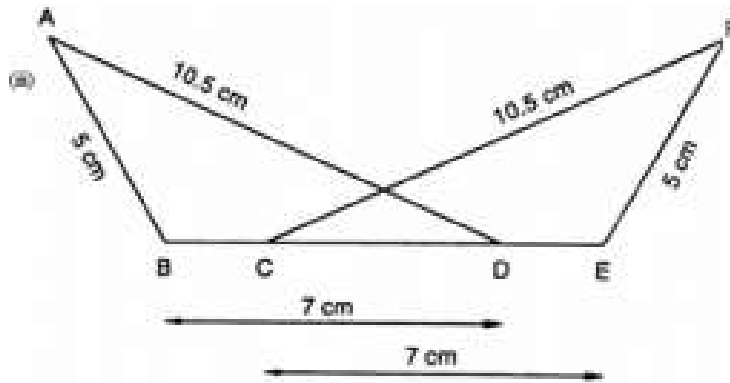
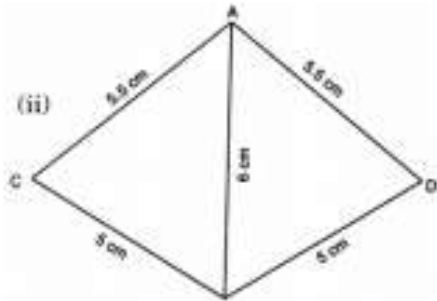
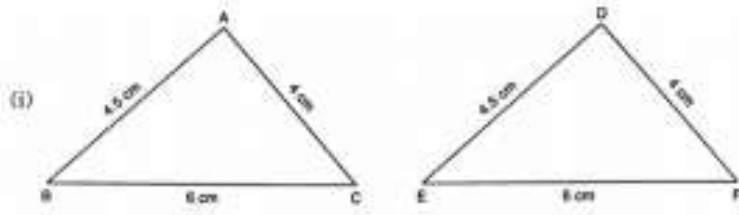
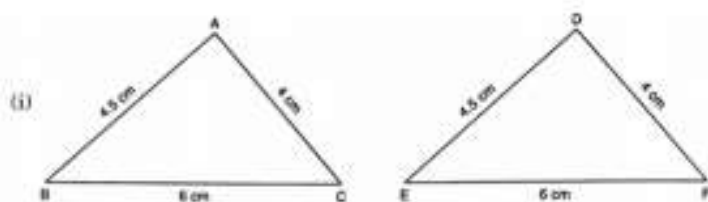


**RD SHARMA**  
**Solutions**  
**Class 7 Maths**  
**Chapter 16**  
**Ex 16.2**

Q1. In the following pairs of triangle (Fig. 12 to 15), the lengths of the sides are indicated along sides. By applying SSS condition, determine which are congruent. State the result in symbolic.



Answer:



1) In  $\triangle ABC$  and  $\triangle DEF$

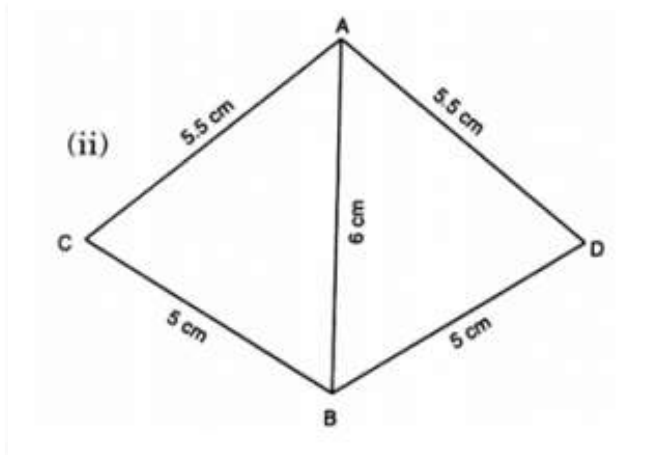
$AB = DE = 4.5 \text{ cm}$  (Side)

$BC = EF = 6 \text{ cm}$  (Side) and

$AC = DF = 4 \text{ cm}$  (Side)

Therefore, by SSS criterion of congruence,  $\triangle ABC \cong \triangle DEF$

2)



In  $\triangle ACB$  and  $\triangle ADB$

$AC = AD$  (Side)

$BC = BD$  (Side) and

$AB = AB$  (Side)

Therefore, by SSS criterion of congruence,  $\triangle ACB \cong \triangle ADB$

3) In  $\triangle ABD$  and  $\triangle FEC$ ,

$AB = FE$  (Side)

$AD = FC$  (Side)

$BD = CE$  (Side)

Therefore, by SSS criterion of congruence,  $\triangle ABD \cong \triangle FEC$

4) In  $\triangle ABO$  and  $\triangle DOC$ ,

$AB = DC$  (Side)

$AO = OC$  (Side)

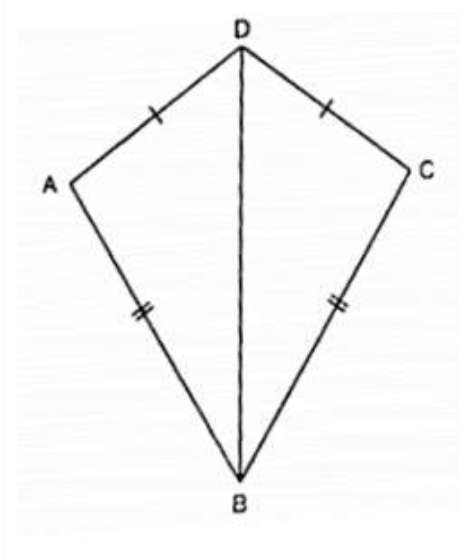
$BO = OD$  (Side)

Therefore, by SSS criterion of congruence,  $\triangle ABO \cong \triangle ODC$

**Q2. In figure,  $AD = DC$  and  $AB = BC$**

(i) Is  $\triangle ABD \cong \triangle CBD$ ?

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



**Answer:**

Yes  $\triangle ABD = \triangle CBD$  by the SSS criterion. We have used the three conditions in the SSS criterion as follows:

$AD = DC$

$AB = BC$  and

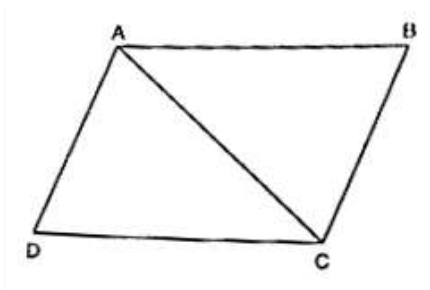
$DB = BD$

**Q3. In Figure,  $AB = DC$  and  $BC = AD$ .**

(i) Is  $\triangle ABC \cong \triangle CDA$ ?

(ii) What congruence condition have you used?

(iii) You have used some fact, not given in the question, what is that?



**Answer:**

We have  $AB = DC$

$BC = AD$

and  $AC = AC$

Therefore by SSS  $\triangle ABC \cong \triangle CDA$

We have used Side Side Side congruence condition with one side common in both the triangles.

Yes, have used the fact that  $AC = CA$ .

**Q4. In  $\triangle PQR \cong \triangle FED$ ,**

(i) Which side of  $\triangle PQR$  equals  $ED$ ?

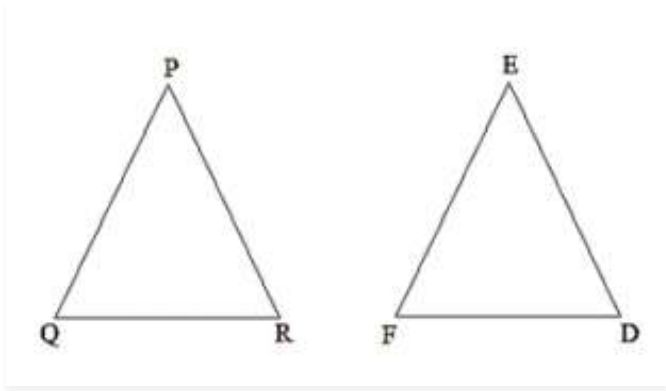
(ii) Which angle of  $\triangle PQR$  equals angle  $E$ ?

**Answer:**

$\triangle PQR \cong \triangle FED$

(i) Therefore  $PR = ED$  since the corresponding sides of congruent triangles are equal.

(ii)  $\angle QPR = \angle FED$  since the corresponding angles of congruent triangles are equal.



**Q5. Triangles ABC and PQR are both isosceles with  $AB = AC$  and  $PQ = PR$  respectively. If also,  $AB = PQ$  and  $BC = QR$ , are the two triangles congruent? Which condition do you use?**

**It  $\angle B = 50^\circ$ , what is the measure of  $\angle R$ ?**

**Answer:**

We have  $AB = AC$  in isosceles  $\Delta ABC$

And  $PQ = PR$  in isosceles  $\Delta PQR$ .

Also, we are given that  $AB = PQ$  and  $QR = BC$ .

Therefore,  $AC = PR$  ( $AB = AC$ ,  $PQ = PR$  and  $AB = PQ$ )

Hence,  $\Delta ABC \cong \Delta PQR$

Now

$\angle ABC = \angle PQR$  (Since triangles are congruent) However,  $\Delta PQR$  is isosceles.

Therefore,  $\angle PRQ = \angle PQR = \angle ABC = 50^\circ$

**Q6. ABC and DBC are both isosceles triangles on a common base BC such that A and D lie on the same side of BC. Are triangles ADB and ADC congruent? Which condition do you use? If  $\angle BAC = 40^\circ$  and  $\angle BDC = 100^\circ$ , then find  $\angle ADB$ .**

**Answer,**

Yes, triangles ADB and ADC are congruent (By SSS)

$AB = AC$ ,  $DB = DC$  and  $AD = DA$

$\angle BAD = \angle CAD$  (c.p.c.t)

$\angle BAD + \angle CAD = 40^\circ / 2$   $\angle BAD = 40^\circ$

$\angle BAD = 40^\circ / 2 = 20^\circ$

$\angle ABC + \angle BCA + \angle BAC = 180^\circ$  (Angle sum property)

Since  $\Delta ABC$  is an isosceles triangle,

$\angle ABC = \angle BCA$   $\angle ABC + \angle ABC + 40^\circ = 180^\circ$

$2 \angle ABC = 180^\circ - 40^\circ = 140^\circ$   $\angle ABC = 140^\circ / 2 = 70^\circ$

$\angle DBC + \angle BCD + \angle BDC = 180^\circ$  (Angle sum property)

Since  $\Delta DBC$  is an isosceles triangle,  $\angle DBC = \angle BCD$   $\angle DBC + \angle DBC + 100^\circ = 180^\circ$

$2 \angle DBC = 180^\circ - 100^\circ = 80^\circ$

$\angle DBC = 80^\circ / 2 = 40^\circ$

In  $\Delta BAD$ ,

$\angle ABD + \angle BAD + \angle ADB = 180^\circ$  (Angle sum property)

$30^\circ + 20^\circ + \angle ADB = 180^\circ$  ( $\angle ADB = \angle ABC - \angle DBC$ ),  $\angle ADB = 180^\circ - 20^\circ - 30^\circ$

$\angle ADB = 130^\circ$

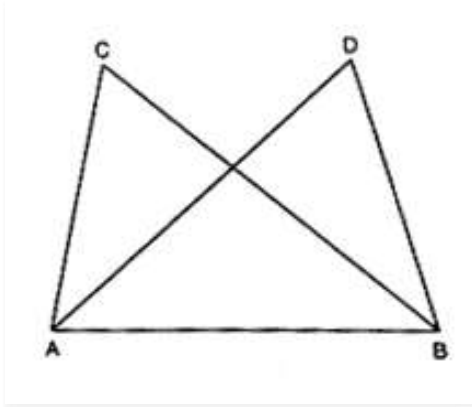
$\angle ADB = 130^\circ$

**Q7.  $\Delta ABC$  and  $\Delta ABD$  are on a common base AB, and  $AC = BD$  and  $BC = AD$  as shown in Fig. 18. Which of the following statements is true?**

(i)  $\Delta ABC \cong \Delta ABD$

(ii)  $\triangle ABC \cong \triangle ADB$

(iii)  $\triangle ABC \cong \triangle BAD$



**Answer:**

In  $\triangle ABC$  and  $\triangle BAD$  we have,

$AC = BD$  (given)

$BC = AD$  (given)

and  $AB = BA$  (common)

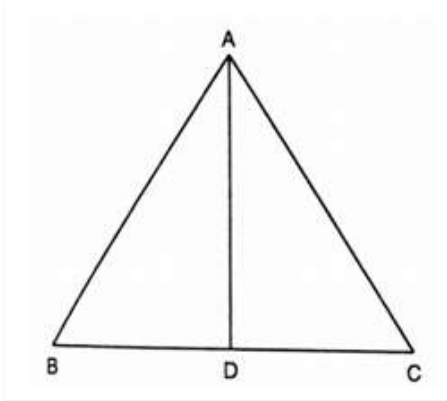
Therefore by SSS criterion of congruency,  $\triangle ABC \cong \triangle BAD$

There option (iii) is true.

**Q8. In Figure,  $\triangle ABC$  is isosceles with  $AB = AC$ , D is the mid-point of base BC.**

(i) Is  $\triangle ADB \cong \triangle ADC$ ?

(ii) State the three pairs of matching parts you use to arrive at your answer.



**Answer:**

We have  $AB = AC$ .

Also since D is the midpoint of BC,  $BD = DC$

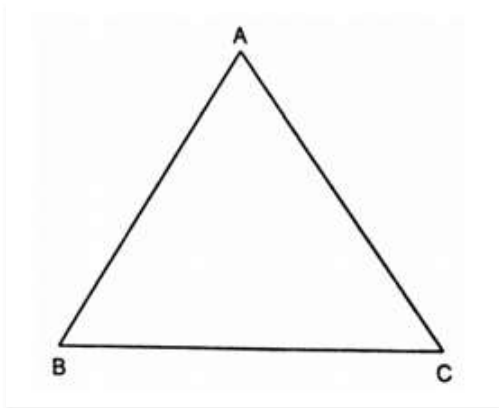
Also,  $AD = DA$

Therefore by SSS condition,

$\triangle ADB \cong \triangle ADC$

We have used  $AB, AC : BD, DC$  AND  $AD, DA$

**Q9. In figure,  $\triangle ABC$  is isosceles with  $AB = AC$ . State if  $\triangle ABC \cong \triangle ACB$ . If yes, state three relations that you use to arrive at your answer.**



**Answer:**

Yes,  $\triangle ABC \cong \triangle ACB$  by SSS condition.

Since, ABC is an isosceles triangle,  $AB = BC$ ,  $BC = CB$  and  $AC = AB$

**Q10. Triangles ABC and DBC have side BC common,  $AB = BD$  and  $AC = CD$ . Are the two triangles congruent? State in symbolic form, which congruence do you use? Does  $\angle ABD$  equal  $\angle ACD$ ? Why or why not?**

**Answer:**

Yes,

Given,

$\triangle ABC$  and  $\triangle DBC$  have side BC common,  $AB = BD$  and  $AC = CD$

By SSS criterion of congruency,  $\triangle ABC \cong \triangle DBC$

No,  $\angle ABD$  and  $\angle ACD$  are not equal because  $AB \neq AC$

