

Board – CBSE

Class – 7th

Topic – Congruence of Triangles 7.2

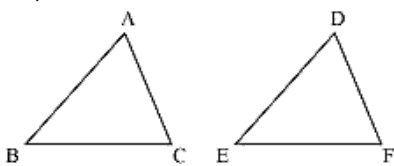
**Q.1** Which congruence criterion do you use in the following?

(a) Given:  $AC = DF$

$AB = DE$

$BC = EF$

So,  $\triangle ABC \cong \triangle DEF$

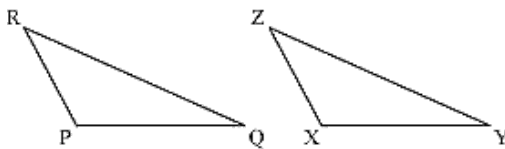


(b) Given:  $ZX = RP$

$RQ = ZY$

$\angle PRQ = \angle XZY$

So,  $\triangle PQR \cong \triangle XYZ$

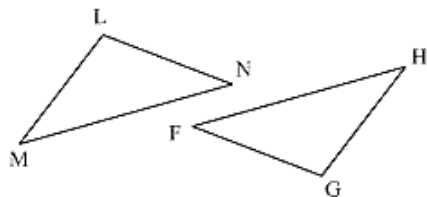


(c) Given:  $\angle MLN = \angle FGH$

$\angle NML = \angle GFH$

$ML = FG$

So,  $\triangle LMN \cong \triangle FGH$

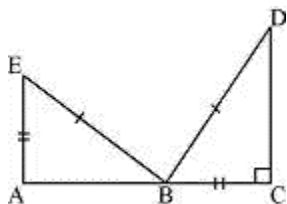


(d) Given:  $EB = DB$

$AE = BC$

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

So,  $\triangle ABE \cong \triangle CDB$



- Sol:
- (a) SSS, as the sides of  $\Delta ABC$  are equal to the sides of  $\Delta DEF$ .
  - (b) SAS, as two sides and the angle included between these sides of  $\Delta PQR$  are equal to two sides and the angle included between these sides of  $\Delta XYZ$ .
  - (c) ASA, as two angles and the side included between these angles of  $\Delta LMN$  are equal to two angles and the side included between these angles of  $\Delta GFH$ .
  - (d) RHS, as in the given two right-angled triangles, one side and the hypotenuse are respectively equal.

**Q.2** You want to show that  $\Delta ART \cong \Delta PEN$ ,

(a) If you have to use SSS criterion, then you need to show

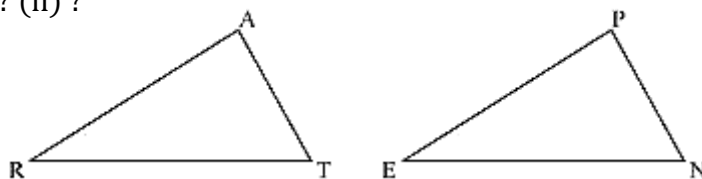
(i)  $AR =$  (ii)  $RT =$  (iii)  $AT =$

(b) If it is given that  $\angle T = \angle N$  and you are to use SAS criterion, you need to have

(i)  $RT =$  and (ii)  $PN =$

(c) If it is given that  $AT = PN$  and you are to use ASA criterion, you need to have

(i) ? (ii) ?



**Sol:** (a) (i)  $AR = PE$  (ii)  $RT = EN$  (iii)  $AT = PN$

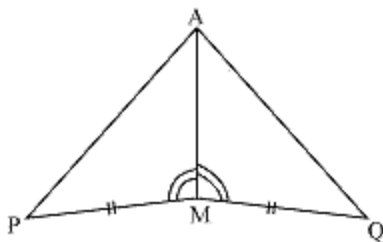
(b) (i)  $RT = EN$  (ii)  $PN = AT$

(c) (i)  $\angle ATR = \angle PNE$  (ii)  $\angle RAT = \angle EPN$

**Q.3** You have to show that  $\Delta AMP \cong \Delta AMQ$ .

In the following proof, supply the missing reasons.

-	Steps	-	Reasons
(i)	$PM = QM$	(i)	...
(ii)	$\angle PMA = \angle QMA$	(ii)	...
(iii)	$AM = AM$	(iii)	...
(iv)	$\Delta AMP \cong \Delta AMQ$	(iv)	...



**Sol:** (i) Given

(ii) Given

(iii) Common

(iv) SAS, as the two sides and the angle included between these sides of  $\Delta AMP$  are equal to two sides and the angle included between these sides of  $\Delta AMQ$ .

**Q.4** In  $\Delta ABC$ ,  $\angle A = 30^\circ$ ,  $\angle B = 40^\circ$  and  $\angle C = 110^\circ$

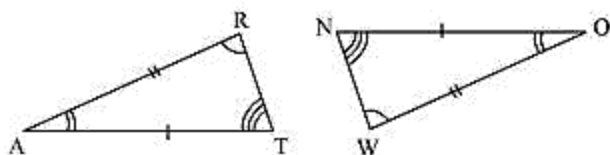
In  $\Delta PQR$ ,  $\angle P = 30^\circ$ ,  $\angle Q = 40^\circ$  and  $\angle R = 110^\circ$

A student says that  $\triangle ABC \cong \triangle PQR$  by AAA congruence criterion. Is he justified? Why or why not?

**Sol:** No. This property represents that these triangles have their respective angles of equal measure. However, this gives no information about their sides. The sides of these triangles have a ratio somewhat different than 1:1. Therefore, AAA property does not prove the two triangles congruent.

**Q.5** In the figure, the two triangles are congruent.

The corresponding parts are marked. We can write  $\triangle RAT \cong ?$



**Sol:** It can be observed that,

$$\angle RAT = \angle WON$$

$$\angle ART = \angle OWN$$

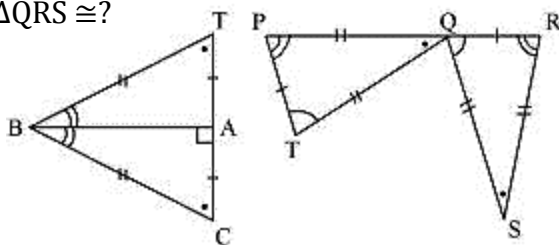
$$AR = OW$$

Therefore,  $\triangle RAT \cong \triangle WON$ , by ASA criterion.

**Q.6** Complete the congruence statement:

$$\triangle BCA \cong ?$$

$$\triangle QRS \cong ?$$



**Sol:** Given that,  $BC = BT$

$$TA = CA$$

BA is common.

Therefore,  $\triangle BCA \cong \triangle BTA$

Similarly,  $PQ = RS$

$$TQ = QS$$

$$PT = RQ$$

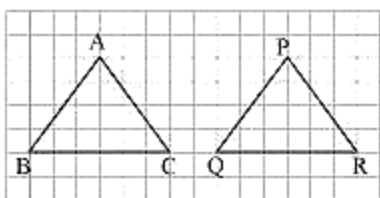
Therefore,  $\Delta QRS \cong \Delta TPQ$

**Q.7** In a squared sheet, draw two triangles of equal areas such that

- (i) The triangles are congruent.
- (ii) The triangles are not congruent.

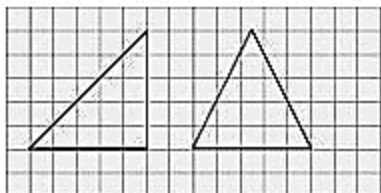
What can you say about their perimeters?

**Sol:** (i)



Here,  $\Delta ABC$  and  $\Delta PQR$  have the same area and are congruent to each other also. Also, the perimeter of both the triangles will be the same.

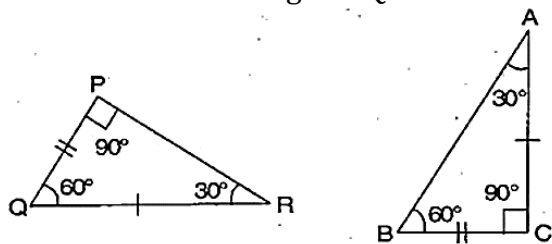
(ii)



Here, the two triangles have the same height and base. Thus, their areas are equal. However, these triangles are not congruent to each other. Also, the perimeter of both the triangles will not be the same.

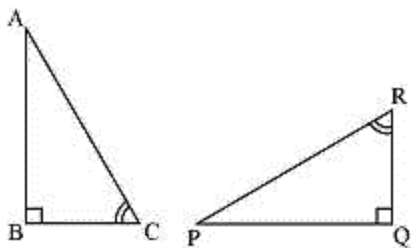
**Q.8** Draw a rough sketch of two triangles such that they have five pairs of congruent parts but still the triangles are not congruent

**Sol:** Let us draw two triangles PQR and ABC.



All angles are equal, two sides are equal except one side. Hence,  $\Delta PQR$  are not congruent to  $\Delta ABC$ .

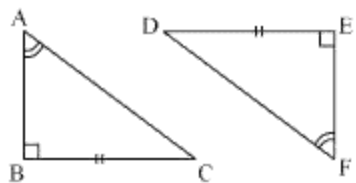
**Q.9** If  $\Delta ABC$  and  $\Delta PQR$  are to be congruent, name one additional pair of corresponding parts. What criterion did you use?



**Sol:**  $BC = QR$   
 $\Delta ABC \cong \Delta PQR$  (ASA criterion)

**Q.10** Explain, why

$$\Delta ABC \cong \Delta FED$$



**Sol:** Given that,  $\angle ABC = \angle FED$  (1)  
 $\angle BAC = \angle FED$  (2)

The two angles of  $\Delta ABC$  are equal to the two respective angles of  $\Delta FED$ . Also, the sum of all interior angles of a triangle is  $180^\circ$ . Therefore, third angle of both triangles will also be equal in measure.

$$\angle BCA = \angle EDF$$
 (3)

Also, given that,  $BC = ED$  (4)

By using equation (1), (3), and (4), we obtain

$$\Delta ABC \cong \Delta FED \text{ (ASA criterion)}$$