

# **NCERT SOLUTIONS**

**CLASS - 7TH**



*aglasem.com*

Class : 7th  
Subject : Maths  
Chapter : 7  
Chapter Name : Congruence of Triangles

---

**Exercise 7.1**

Q1 Complete the following statements:

- (a) Two line segments are congruent if \_\_\_\_\_.
- (b) Among two congruent angles, one has a measure of  $70^\circ$ ; the measure of the other angle is \_\_\_\_\_.
- (c) When we write  $\angle A = \angle B$ , we actually mean \_\_\_\_\_.

Answer. (a) They have the same length

(b)  $70^\circ$

(c)  $m \angle A = m \angle B$

Page : 138 , Block Name : Exercise 7.1

Q2 Give any two real-life examples for congruent shapes.

Answer. (i) Sheets of same letter pad

(ii) Biscuits in the same packet

Page : 138 , Block Name : Exercise 7.1

Q3 If  $\triangle ABC \cong \triangle FED$  under the correspondence  $ABC \leftrightarrow FED$ , write all the corresponding congruent parts of the triangles.

Answer. If these triangles are congruent, then the corresponding angles and sides will be equal to each other.

$$\angle A \leftrightarrow \angle F$$

$$\angle B \leftrightarrow \angle E$$

$$\angle C \leftrightarrow \angle D$$

$$\overline{BC} \leftrightarrow \overline{FE}$$

$$\overline{BC} \leftrightarrow \overline{ED}$$

$$\overline{CA} \leftrightarrow \overline{DF}$$

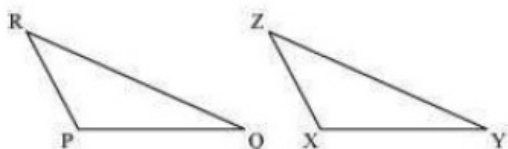
Page : 138 , Block Name : Exercise 7.1

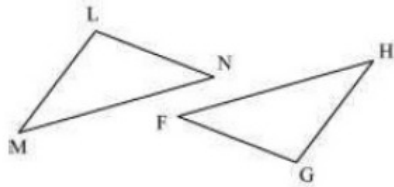
Q4 If  $\triangle DEF \cong \triangle BCA$ , write the part(s) of  $\triangle BCA$  that correspond to(i)  $\angle E$ (ii)  $\overline{EF}$ (iii)  $\angle F$  (iv)  $\overline{DF}$ Answer. (i)  $\angle C$ (ii)  $\overline{CA}$ (iii)  $\angle A$ (iv)  $\overline{BA}$ 

Page : 138 , Block Name : Exercise 7.1

**Exercise 7.2**

Q1 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,  $\triangle LMN \cong \triangle GFH$

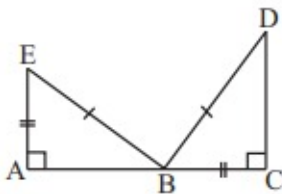


(d) Given:  $EB = DB$

$AE = BC$

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

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



Answer. (a) SSS, as the sides of  $\triangle ABC$  are equal to the sides of  $\triangle DEF$ .

(b) SAS, as two sides and the angle included between these sides of  $\triangle PQR$  are equal to two sides and the angle included between these sides of  $\triangle XYZ$ .

(c) ASA, as two angles and the side included between these angles of  $\triangle LMN$  are equal to two angles and the side included between these angles of  $\triangle GFH$ .

(d) RHS, as in the given two right-angled triangles, one side and the hypotenuse are respectively equal.

Page : 149 , Block Name : Exercise 7.2

Q2 You want to show that  $\triangle ART \cong \triangle PEN$ ,

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

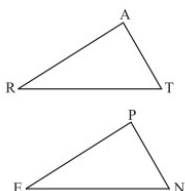
(i)  $AR = PE$  (ii)  $RT = EN$  (iii)  $AT = PN$

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

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

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

(i)  $\angle A = \angle P$  (ii)  $\angle R = \angle E$



Answer. (a)

(i)  $AR = PE$

(ii)  $RT = EN$

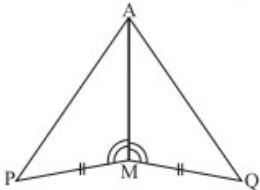
(iii)  $AT = PN$

- (b) (i)  $RT = EN$   
 (ii)  $PN = AT$   
 (c) (i)  $\angle ATR = \angle PNE$   
 (ii)  $\angle RAT = \angle EPN$

Page : 149 , Block Name : Exercise 7.2

Q3 You have to show that  $\triangle AMP \cong \triangle AMQ$ . In the following proof, supply the missing reasons.

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) $\triangle AMP \cong \triangle AMQ$	(iv) ...

Answer. (i) Given

(ii) Given

(iii) Common

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

Page : 150 , Block Name : Exercise 7.2

Q4 In  $\triangle ABC$ ,  $\angle A = 30^\circ$ ,  $\angle B = 40^\circ$  and  $\angle C = 110^\circ$

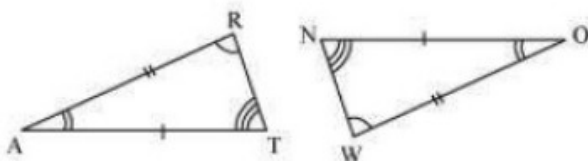
In  $\triangle PQR$ ,  $\angle P = 30^\circ$ ,  $\angle Q = 40^\circ$  and  $\angle R = 110^\circ$  /

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

Answer. 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.

Page : 150 , Block Name : Exercise 7.2

Q5 In the figure, the two triangles are congruent. The corresponding parts are marked. We can write  $\triangle RAT \cong ?$



Answer. It can be observed that,  
 $\angle RAT = \angle WON$

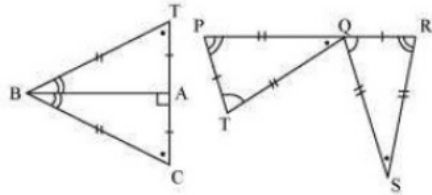
$$\angle ART = \angle OWN$$

$$AR = OW$$

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

Page : 150 , Block Name : Exercise 7.2

Q6 Complete the congruence statement:



Answer. Given that,  $BC = BT$

$$TA = CA$$

BA is common.

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

Similarly,  $PQ = RS$

$$TQ = QS$$

$$PT = RQ$$

Therefore,  $\triangle QRS \cong \triangle TPQ$

Page : 150 , Block Name : Exercise 7.2

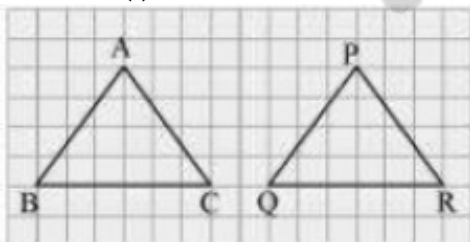
Q7 In a squared sheet, draw two triangles of equal areas such that :

(i) the triangles are congruent.

(ii) the triangles are not congruent.

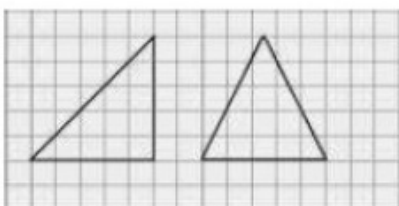
What can you say about their perimeters?

Answer. (i)



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

(ii)

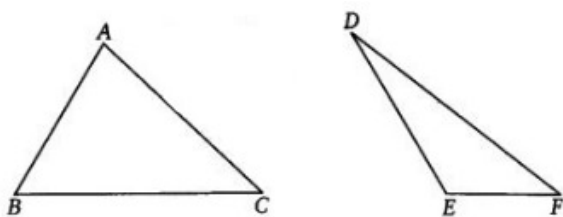


Here, the two triangles have the same height and base. Thus, their areas are equal. However, these triangles are not congruent to each other. Also, the perimeter of both the triangles will not be the same.

Page : 150 , Block Name : Exercise 7.2

Q8 Draw a rough sketch of two triangles such that they have five pairs of congruent parts but still the triangles are not congruent.

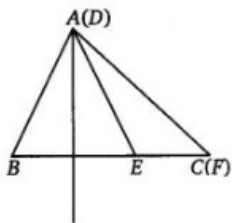
Answer. In some special cases (which depend on the lengths of the sides and the size of the angle involved), SSA is enough to show congruence. However, it is not always enough. Consider the following triangles :



Here side AB is congruent to side DE (S) side AC is congruent to side DF (S) angle C is congruent to angle F (A)

But the triangles are not congruent, as we can see.

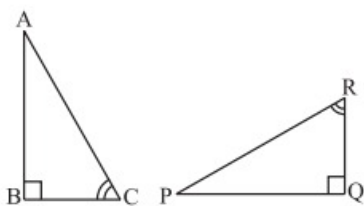
What happens is this : If we draw a vertical line through point A in the first triangle, we can sort of “flip” side AB around this line to get the second triangle. If we were to lay one triangle on top of the other and draw the vertical line, this how it would look.



Clearly, side DE is just side AB flipped around the line. So, we have not changed the length of the side, and the other side AC (or DF) is unchanged, as is angle C (or F). So, these two triangles that have the same SSA information, but they are not congruent.

Page : 150 , Block Name : Exercise 7.2

Q9 If  $\triangle ABC$  and  $\triangle PQR$  are to be congruent, name one additional pair of corresponding parts. What criterion did you use?

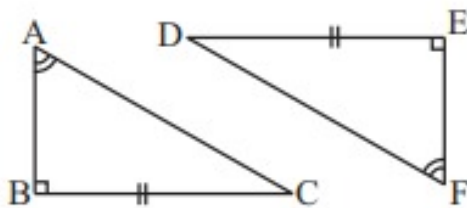


Answer.  $BC = QR$

$\triangle ABC \cong \triangle PQR$  (ASA criterion)

Page : 150 , Block Name : Exercise 7.2

Q10 Explain, why  $\triangle ABC \cong \triangle FED$ .



Answer. Given that,  $\angle ABC = \angle FED$  (1)

$\angle BAC = \angle EFD$  (2)

The two angles of  $\triangle ABC$  are equal to the two respective angles of  $\triangle FED$ . 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)

Page : 151 , Block Name : Exercise 7.2