

NCERT Solutions for Class 7 Maths Chapter 7

Congruence of Triangles Class 7

Chapter 7 Congruence of Triangles Exercise 7.1, 7.2 Solutions

Exercise 7.1 : Solutions of Questions on Page Number : 137

Q1 :

Complete the following statements:

- (a) Two line segments are congruent if _____.
- (b) Among two congruent angles, one has a measure of 70° ; 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°
- (c) $m \angle A = m \angle B$

Q2 :

Give any two real-life examples for congruent shapes.

Answer :

- (i) Sheets of same letter pad (ii)
Biscuits in the same packet

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.

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

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

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

$$\overline{AB} \leftrightarrow \overline{FE}$$

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

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

Q4 :

If $\triangle DEF \cong \triangle BCA$, write the part(s) of $\triangle BCA$ that correspond to

(i) \overline{EF} , (ii) $\angle F$, (iii) $\angle C$, (iv) \overline{DF}

Answer :

(i) $\angle C$

\overline{CA} (ii)

(iii) $\angle A$

\overline{BA} (iv)

Exercise 7.2 : Solutions of Questions on Page Number : 149

Q1 :

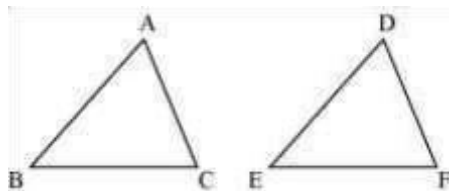
Which congruence criterion do you use in the following?

(a) Given: $AC = DF$

$AB = DE$

$BC = EF$

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

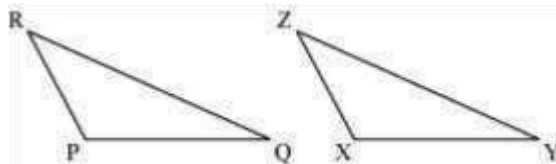


(b) Given: $ZX = RP$

$RQ = ZY$

$\angle PRQ = \angle XZY$

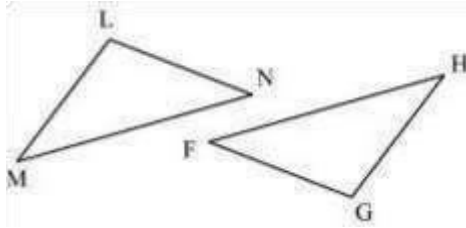
So, $\triangle PQR \cong \triangle XYZ$



(c) Given: $\angle MLN = \angle FGH$, $\angle NML = \angle GFH$

$ML = FG$

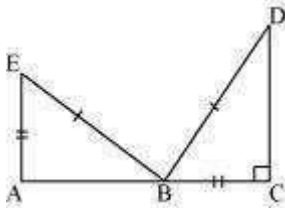
So, $\triangle LMN \cong \triangle GFH$



(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.

Q2 :

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

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

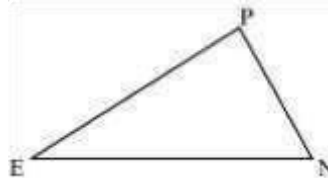
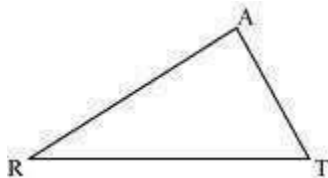
(i) $AR =$ (ii) $RT =$ (iii) $AT =$

(b) If it is given that $\angle R = \angle N$ 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) ?



Answer :

- (a)
 (i) $AR = PE$

(ii) $RT = EN$

(iii) $AT = PN$

(b)

(i) $RT = EN$

(ii) $PN = AT$

(c)

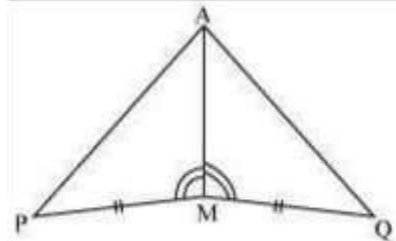
(i) $\triangle ATR = \triangle PNE$ (ii) $\triangle RAT = \triangle EPN$

Q3 :

You have to show that $\triangle AMP \cong \triangle AMQ$.

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

Q4 :

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

In $\triangle PQR$, $\angle P = 30^\circ$, $Q = 40^\circ$ and $R = 110^\circ$ A student says that $\triangle ABC \cong \triangle PQR$ by AAA congruence criterion. Is he justified? Why or why not?

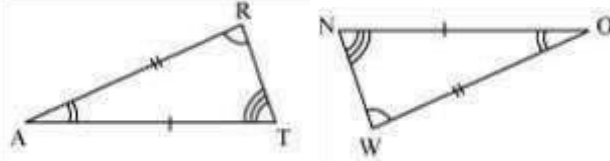
Answer :

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.

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,

$$\angle RAT = \angle WON$$

$$\begin{aligned} \angle ART &= \angle ONW \\ \angle RTA &= \angle NOW \end{aligned}$$

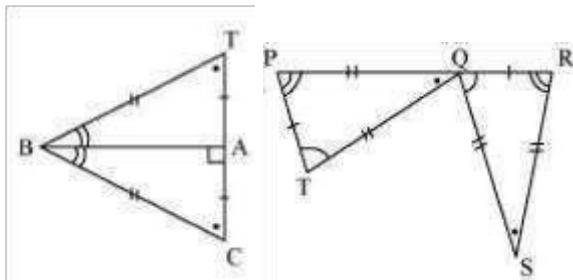
Therefore, $\triangle RAT \cong \triangle WON$, by ASA criterion.

Q6 :

Complete the congruence statement:

$\triangle BCA \cong ?$

$\triangle QRS \cong ?$



Answer :

Given that, $BC = BT$

$TA = CA$

BA is common.

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

Similarly, $PQ = RS$

$TQ = QS$

$\angle PTQ = \angle RQS$

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

Q7 :

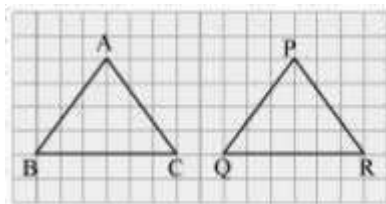
In a squared sheet, draw two triangles of equal areas such that (i)
The triangles are congruent.

(ii) The triangles are not congruent.

What can you say about their perimeters?

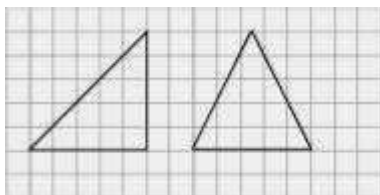
Answer :

(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.

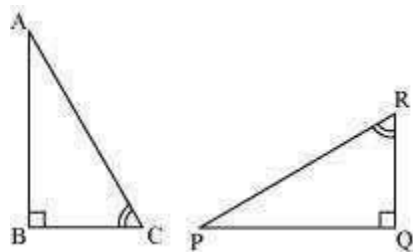
(ii)



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.

Q8 :

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



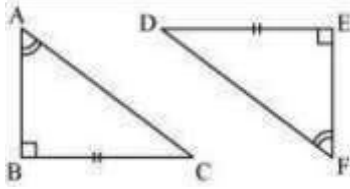
Answer :

$BC = QR$

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

Q9 : 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° .

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

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