Question 1. Which congruence criterion do you use in the following?
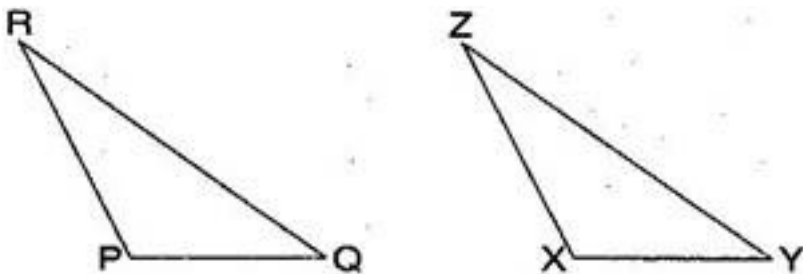
(a) Given: AC = DF, AB = DE, BC = EF

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

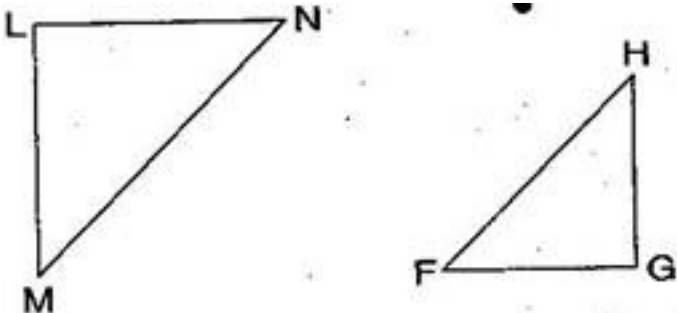

(b) Given: RP = ZX, RQ = ZY, $\angle$PRQ = $\angle$XZY
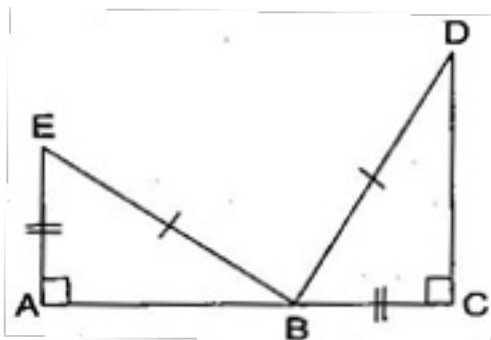
So $\triangle$PQR $\cong$ $\triangle$XYZ

(c) Given: $\angle$MLN = $\angle$FGH, $\angle$NML = $\angle$HFG, ML = FG

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

(d) Given: EB = BD, AE = CB, $\angle$A = $\angle$C = $90°$

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

Answer: (a) By SSS congruence criterion, since it is given that AC = DF, AB = DE, BC = EF

The three sides of one triangle are equal to the three corresponding sides of another triangle.

Therefore, $\triangle$ABC $\cong$ $\triangle$DEF

(b) By SAS congruence criterion, since it is given that RP = ZX, RQ = ZY and $\angle$PRQ = $\angle$XZY

The two sides and one angle in one of the triangle are equal to the corresponding sides and the angle of other triangle.

Therefore, $\triangle$PQR $\cong$ $\triangle$XYZ

(c) By ASA congruence criterion, since it is given that $\angle$MLN = $\angle$FGH, $\angle$NML = $\angle$HFG, ML = FG.

The two angles and one side in one of the triangle are equal to the corresponding angles and side of other triangle.

Therefore, $\triangle$LMN $\cong$ $\triangle$GFH

(d) By RHS congruence criterion, since it is given that EB = BD, AE = CB, $\angle$A = $\angle$C = 90°

Hypotenuse and one side of a right angled triangle are respectively equal to the hypotenuse and one side of another right angled triangle.

Therefore, $\triangle$ABE $\cong$ $\triangle$CDB

Question 2. You want to show that $\triangle$ART $\cong$ $\triangle$PEN:
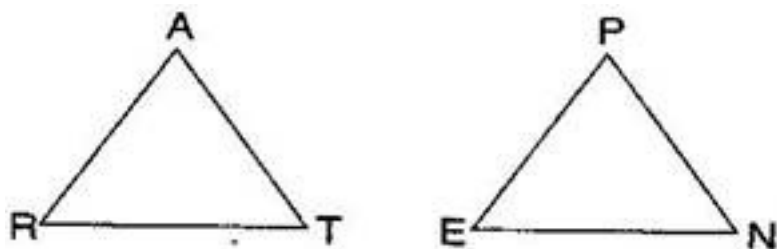
If you have to use SSS criterion, then you need to show:

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

If it is given that ∠T = ∠N and you are to use SAS criterion, you need to have:

(i) RT = and(ii) PN =

If it is given that AT = PN and you are to use ASA criterion, you need to have:

(i) ? (ii) ?

Answer: (a) Using SSS criterion, $\triangle$ART $\cong$ $\triangle$PEN

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

(b) Given: ∠T = ∠N

Using SAS criterion, $\triangle$ART $\cong$ $\triangle$PEN

(i) RT = EN (ii) PN = AT
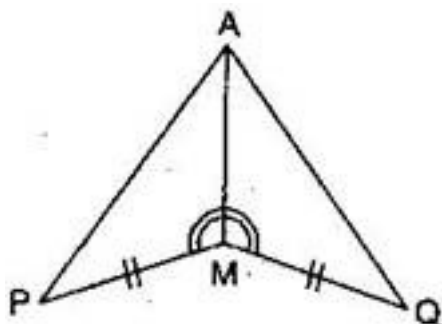
(c) Given: AT = PN

Using ASA criterion, $\triangle$ART $\cong$ $\triangle$PEN

(i) ∠RAT = ∠EPN (ii) ∠RTA = ∠ENP

Question 3. You have to show that $\triangle$AMP $\cong$ $\triangle$AMQ. In the following proof, supply the missing reasons:

Steps	Reasons

1. PM = QM	1. _____
2. ∠PMA = ∠QMA	2. _____
3. AM = AM	3. _____
4. $\triangle$AMP $\cong$ $\triangle$AMQ	4. _____

Answer:

Steps	Reasons
1. PM = QM	1. Given
2. ∠PMA = ∠QMA	2. Given
3. AM = AM	3. Common
4. $\triangle$AMP $\cong$ $\triangle$AMQ	4. SAS congruence rule

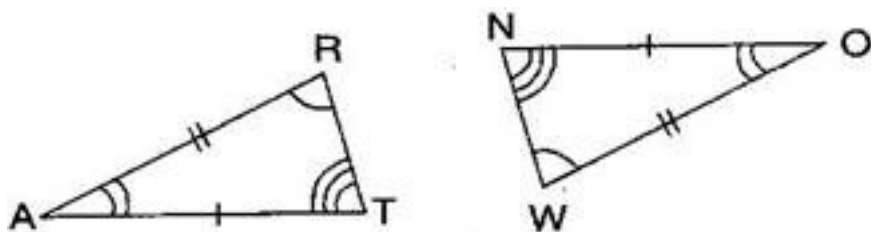**Question 4.** In $\triangle$ABC, $\angle A = 30°, \angle B = 40°$ and $\angle C = 110°$.

In $\triangle$PQR, $\angle P = 30°, \angle Q = 40°$ and $\angle R = 110°$.

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

Answer: No, because the two triangles with equal corresponding angles need not be congruent. In such a correspondence, one of them can be an enlarged copy of the other.

Question 5. In the figure, the two triangles are congruent. The corresponding parts are marked. We can write $\triangle$RAT $\cong$?
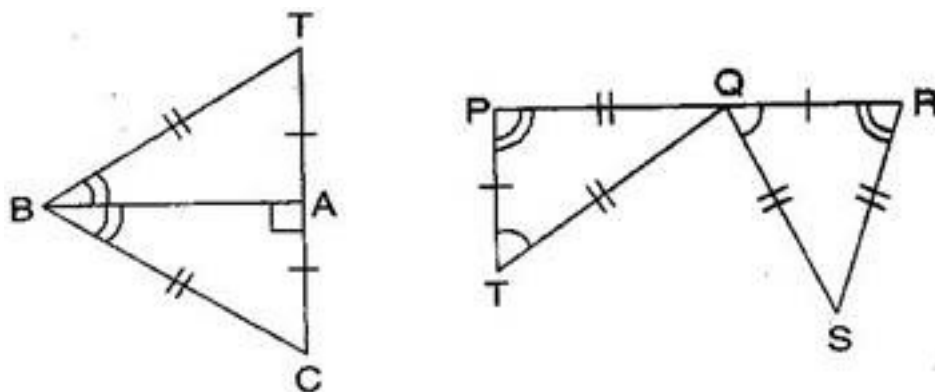

Answer: In the figure, given two triangles are congruent. So, the corresponding parts are:

A $\leftrightarrow$ O, R $\leftrightarrow$ W, T $\leftrightarrow$ N.

We can write, $\triangle$RAT $\cong$ $\triangle$WON [By SAS congruence rule]

Question 6. Complete the congruence statement:

$\triangle$ BCA $\cong$? $\triangle$ QRS $\cong$?

Answer: In $\triangle$ BAT and $\triangle$ BAC, given triangles are congruent so the corresponding parts are:

B $\leftrightarrow$ B, A $\leftrightarrow$ A, T $\leftrightarrow$ C

Thus, $\triangle$ BCA $\cong$ $\triangle$ BTA [By SSS congruence rule]

In $\triangle$ QRS and $\triangle$ TPQ, given triangles are congruent so the corresponding parts are:

P $\leftrightarrow$ R, T $\leftrightarrow$ Q, Q $\leftrightarrow$ S

Thus, $\triangle$ QRS $\cong$ $\triangle$ TPQ [By SSS congruence rule]

Question 7. In a squared sheet, draw two triangles of equal area such that:

(i) the triangles are congruent.

(ii) the triangles are not congruent.

What can you say about their perimeters?

Answer: In a squared sheet, draw $\triangle$ ABC and $\triangle$ PQR.

When two triangles have equal areas and

(i) these triangles are congruent, i.e., $\triangle$ ABC $\cong$ $\triangle$ PQR
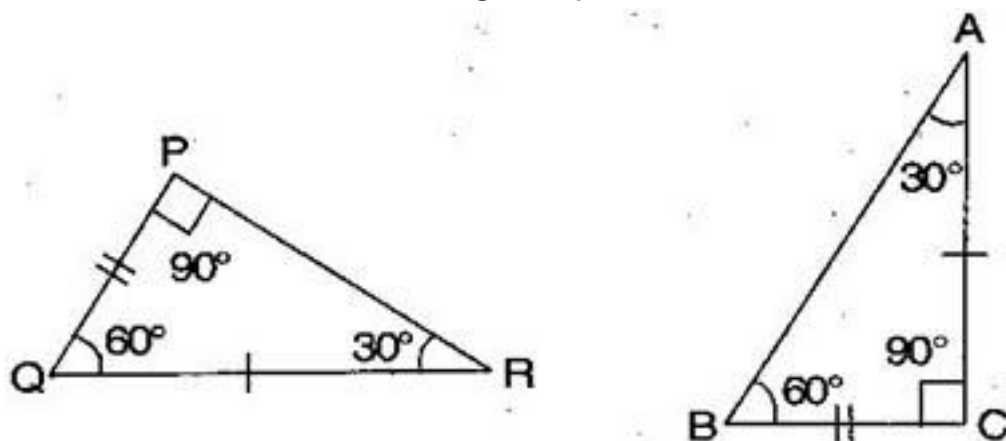
[By SSS congruence rule]

Then, their perimeters are same because length of sides of first triangle are equal to the

length of sides of another triangle by SSS congruence rule.

(ii) But, if the triangles are not congruent, then their perimeters are not same because lengths of sides of first triangle are not equal to the length of corresponding sides of another triangle.
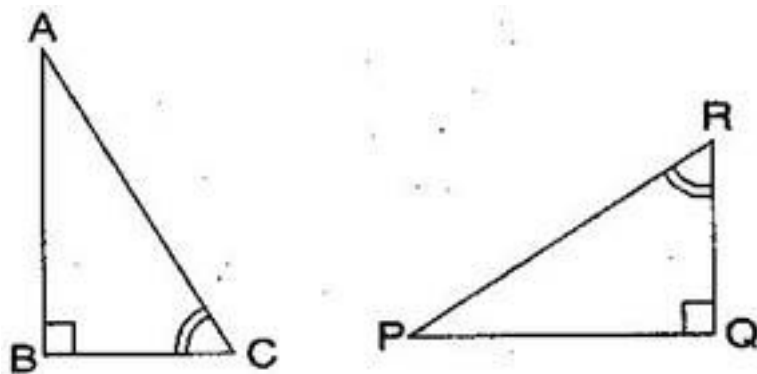
Question 8. Draw a rough sketch of two triangles such that they have five pairs of congruent parts but still the triangles are not congruent.

Answer: Let us draw two triangles PQR and ABC.

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

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

Answer: $\triangle$ABC and $\triangle$PQR are congruent. Then one additional pair is $\overline{BC} = \overline{QR}$.
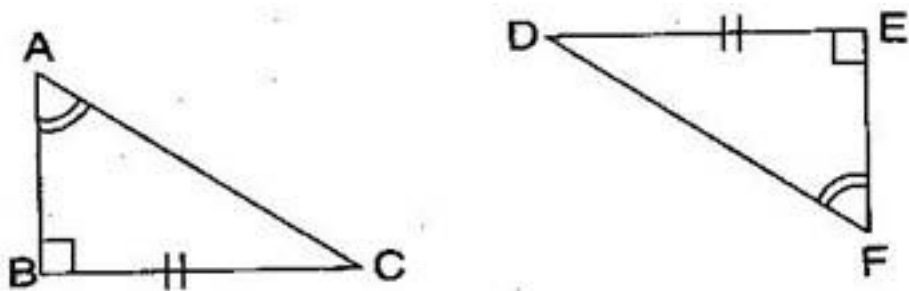
Given: $\angle B = \angle Q = 90°$

$\angle C = \angle R$

$\overline{BC} = \overline{QR}$

Therefore, $\triangle ABC \cong \triangle PQR$ [By ASA congruence rule]

Question 10. Explain, why $\triangle ABC \cong \triangle FED$.

Answer: Given: $\angle A = \angle F$, BC = ED, $\angle B = \angle E$

In $\triangle ABC$ and $\triangle FED$,

$\angle B = \angle E = 90°$

$\angle A = \angle F$

BC = ED

Therefore, $\triangle ABC \cong \triangle FED$ [By RHS congruence rule]