Class –VII Mathematics (Ex. 7.1)
Questions

1. 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 other angle is _____.
   (c) When we write $\angle A = \angle B$, we actually mean _____.

2. Give any two real time examples for congruent shapes.
3. If $\Delta ABC \cong \Delta FED$ under the correspondence $ABC \leftrightarrow FED$, write all the corresponding congruent parts of the triangles.
4. If $\Delta DEF \cong \Delta BCA$, write the part(s) of ΔBCA that correspond to:
   (i) $\angle E$
   (ii) $\overline{EF}$
   (iii) $\angle F$
   (iv) $\overline{DF}$

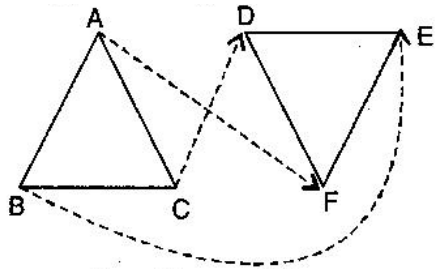
Class –VII Mathematics (Ex. 7.1)

Answers

1. (a) they have the same length
   (b) $70°$
   (c) $m\angle A = m\angle B$

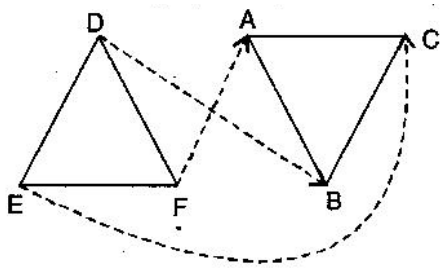
2. (i) Two footballs (ii) Two teacher's tables

3. Given: $\Delta ABC \cong \Delta FED$.



   The corresponding congruent parts of the triangles are:
   (i) $\angle A \leftrightarrow \angle F$
   (ii) $\angle B \leftrightarrow \angle E$
   (iii) $\angle C \leftrightarrow \angle D$
   (iv) $\overline{AB} \leftrightarrow \overline{FE}$
   (v) $\overline{BC} \leftrightarrow \overline{ED}$
   (vi) $\overline{AC} \leftrightarrow \overline{FD}$

4. Given: $\Delta DEF \cong \Delta BCA$.



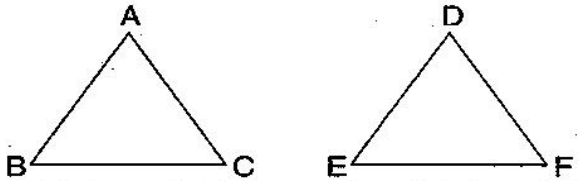
   (i) $\angle E \leftrightarrow \angle C$
   (ii) $\overline{EF} \leftrightarrow \overline{CA}$
   (iii) $\angle F \leftrightarrow \angle A$
   (iv) $\overline{DF} \leftrightarrow \overline{BA}$

Class –VII Mathematics (Ex. 7.2)
Questions

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

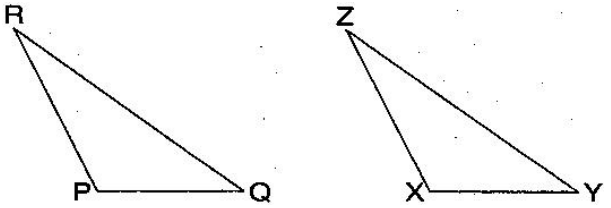
(a) Given: AC = DF, AB = DE, BC = EF

So $\Delta ABC \cong \Delta DEF$



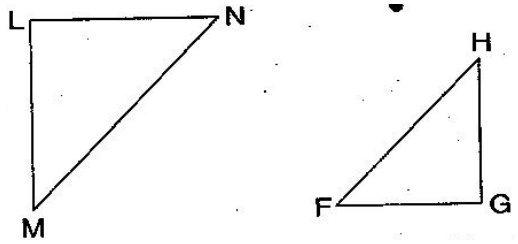
(b) Given: RP = ZX, RQ = ZY, $\angle PRQ = \angle XZY$

So $\Delta PQR \cong \Delta XYZ$



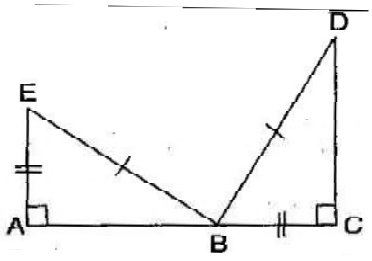
(c) Given: $\angle MLN = \angle FGH$, $\angle NML = \angle HFG$, ML = FG

So $\Delta LMN \cong \Delta GFH$



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

So $\Delta ABE \cong \Delta CDB$



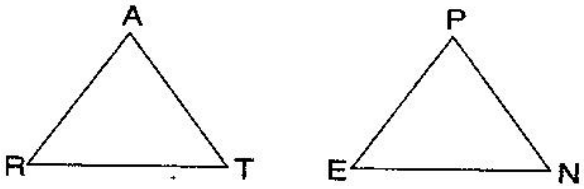
2. You want to show that $\Delta ART \cong \Delta PEN$:

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

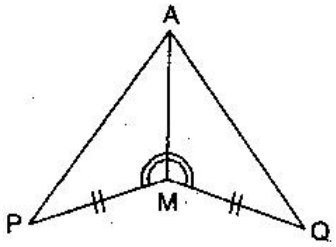
(i) AR = (ii) RT = (iii) AT =

(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) ?



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



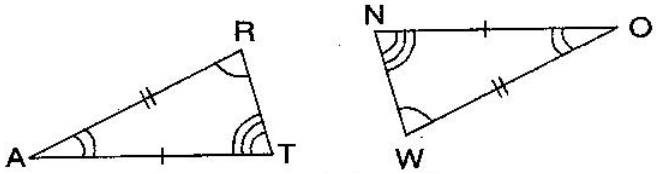
Steps	Reasons
(i) PM = QM	(i) _____
(ii) $\angle PMA = \angle QMA$	(ii) _____
(iii) AM = AM	(iii) _____
(iv) $\Delta AMP \cong \Delta AMQ$	(iv) _____

4. In ΔABC, $\angle A = 30^\circ$, $\angle B = 40°$ and $\angle C = 110°$.

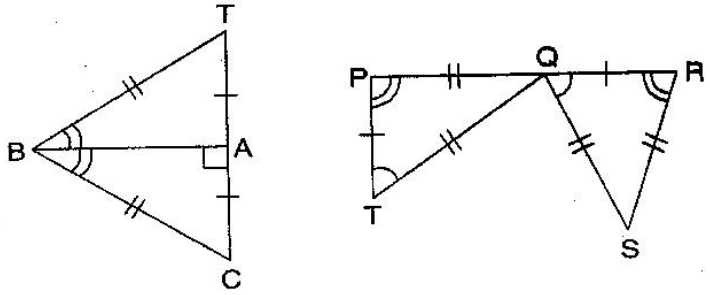
In ΔPQR, $\angle P = 30^\circ$, $\angle Q = 40°$ and $\angle R = 110°$.

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

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



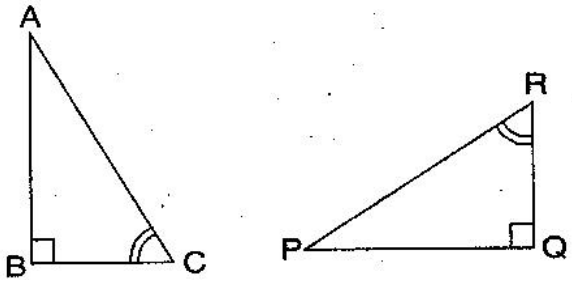
6. Complete the congruence statement:



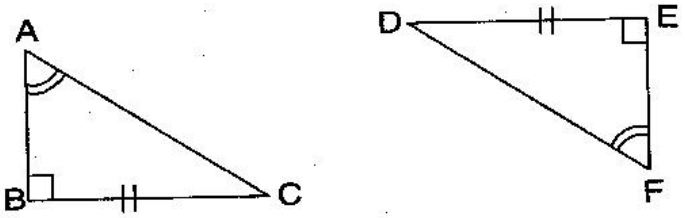
$\Delta BCA \cong$? $\Delta QRS \cong$?

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?

8. Draw a rough sketch of two triangles such that they have five pairs of congruent parts but still the triangles are not congruent.
9. If ΔABC and ΔPQR are to be congruent, name one additional pair of corresponding parts. What criterion did you use?



10. Explain, why $\Delta ABC \cong \Delta FED$.



Class –VII Mathematics (Ex. 7.2)

Answers

1. (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, $\Delta ABC \cong \Delta DEF$
   (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, $\Delta PQR \cong \Delta XYZ$
   (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, $\Delta LMN \cong \Delta GFH$
   (d) By RHS congruence criterion, since it is given that EB = BD, AE = CB, $\angle A = \angle C = 90^\circ$
   Hypotenuse and one side of a right angled triangle are respectively equal to the hypotenuse and one side of another right angled triangle.
   Therefore, $\Delta ABE \cong \Delta CDB$

2. (a) Using SSS criterion, $\Delta ART \cong \Delta PEN$
   (i) AR = PE (ii) RT = EN (iii) AT = PN
   (b) Given: $\angle T = \angle N$
   Using SAS criterion, $\Delta ART \cong \Delta PEN$
   (i) RT = EN (ii) PN = AT
   (c) Given: AT = PN
   Using ASA criterion, $\Delta ART \cong \Delta PEN$
   (i) $\angle RAT = \angle EPN$ (ii) $\angle RTA = \angle ENP$

3. Sol.

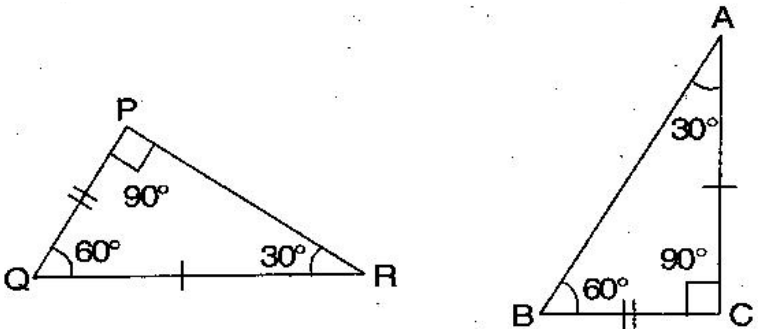
Steps	Reasons
(i) PM = QM	(i) Given
(ii) $\angle PMA = \angle QMA$	(ii) Given
(iii) AM = AM	(iii) Common
(iv) $\Delta AMP \cong \Delta AMQ$	(iv) SAS congruence rule

4. 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.
5. 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, $\Delta RAT \cong \Delta WON$ [By SAS congruence rule]

6. In Δ BAT and Δ BAC, given triangles are congruent so the corresponding parts are:
   B $\leftrightarrow$ B, A $\leftrightarrow$ A, T $\leftrightarrow$ C
   Thus, Δ BCA $\cong$ Δ BTA [By SSS congruence rule]
   In Δ QRS and Δ TPQ, given triangles are congruent so the corresponding parts are:
   P $\leftrightarrow$ R, T $\leftrightarrow$ Q, Q $\leftrightarrow$ S
   Thus, Δ QRS $\cong$ Δ TPQ [By SSS congruence rule]

7. In a squared sheet, draw Δ ABC and Δ PQR.
   When two triangles have equal areas and
   (i) these triangles are congruent, i.e., Δ ABC $\cong$ Δ 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.

8. Let us draw two triangles PQR and ABC.



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

9. Δ ABC and Δ PQR are congruent. Then one additional pair is $\overline{BC} = \overline{QR}$.
   Given: $\angle B = \angle Q = 90^\circ$
   $\angle C = \angle R$
   $\overline{BC} = \overline{QR}$
   (iii) Therefore, Δ ABC $\cong$ Δ PQR [By ASA congruence rule]

10. Given: $\angle A = \angle F$, BC = ED, $\angle B = \angle E$
    In Δ ABC and Δ FED,
    $\angle B = \angle E = 90^\circ$
    $\angle A = \angle F$
    BC = ED
    Therefore, Δ ABC $\cong$ Δ FED [By RHS congruence rule]