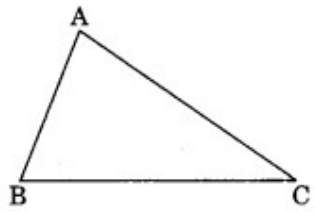
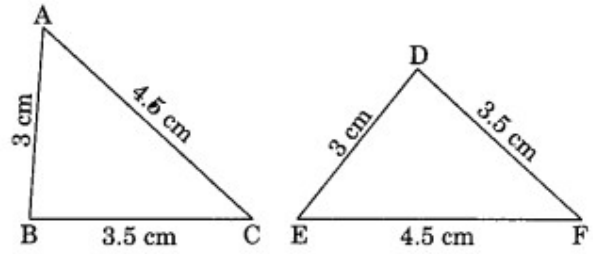
CHAPTER 12
CONGRUENCY

Question 1.
In the given figure, name
(a) the side opposite to vertex A
(b) the vertex opposite A to side AB
(c) the angle opposite to side AC
(d) the angle made by the sides CB and CA.



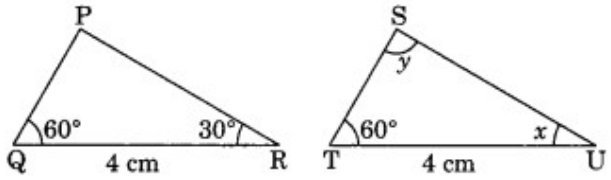
Solution:
(a) The side opposite to vertex A is BC.
(b) The vertex opposite to side AB is C.
(c) The angle opposite to side AB is ∠ACB.
(d) The angle made by the sides CB and CA is ∠ACB.

Question 2.
Examine whether the given triangles are congruent or not.
Solution:
Here,
AB = DE = 3 cm
BC = DF = 3.5 cm
AC = EF = 4.5 cm
ΔABC = ΔEDF (By SSS rule)



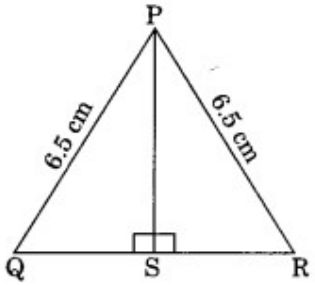
So, ΔABC and ΔEDF are congruent.

Question 3.
In the given congruent triangles under ASA, find the value of x and y, ΔPQR = ΔSTU.



Solution:
Given: ΔPQR = ΔSTU (By ASA rule)
∠Q = ∠T = 60° (given)
$\overline{QR}$ = $\overline{TU}$ = 4 cm (given)
∠x = 30° (for ASA rule)
Now in ΔSTU,
∠S + ∠T + ∠U = 180° (Angle sum property)
∠y + 60° + ∠x = 180°
∠y + 60° + 30° = 180°
∠y + 90° = 180°
∠y = 180° – 90° = 90°
Hence, x = 30° and y = 90°.

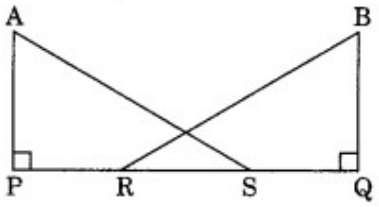
Question 4.
In the following figure, show that ΔPSQ = ΔPSR.



Solution:
In ΔPSQ and ΔPSR
$\overline{PQ}$ = $\overline{PR}$ = 6.5 cm (Given)
$\overline{PS}$ = $\overline{PS}$ (Common)
∠PSQ = ∠PSR = 90° (Given)
ΔPSQ = ΔPSR (By RHS rule)

Question 5.
Can two equilateral triangles always be congruent? Give reasons.
Solution:
No, any two equilateral triangles are not always congruent.
Reason: Each angle of an equilateral triangle is 60° but their corresponding sides cannot always be the same.

Question 6.
In the given figure, AP = BQ, PR = QS. Show that ΔAPS = ΔBQR



Solution:
In ΔAPS and ΔBQR
AP = BQ (Given)
PR = QS (Given)
PR + RS = QS + RS (Adding RS to both sides)
PS = QR
∠APS = ∠BQR = 90° (Given)
ΔAPS = ΔBQR (by SAS rule)

Question 7.
Without drawing the figures of the triangles, write all six pairs of equal measures in each of the following pairs of congruent triangles.
(i) ΔABC = ADEF
(ii) ΔXYZ = ΔMLN
Solution:
(i) Given: ΔABC = ΔDEF
Here AB = DE
BC = EF
AC = DF
∠A = ∠D, ∠B = ∠E and ∠C = ∠F
(ii) Given ΔXYZ = ΔMLN
Here XY = ML
YZ = LN
XZ = MN
∠X = ∠M, ∠Y = ∠L and ∠Z = ∠N

Question 8.
Lengths of two sides of an isosceles triangle are 5 cm and 8 cm, find the perimeter of the triangle.
Solution:
Since the lengths of any two sides of an isosceles triangle are equal, then
Case I: The three sides of the triangle are 5 cm, 5 cm and 8 cm.