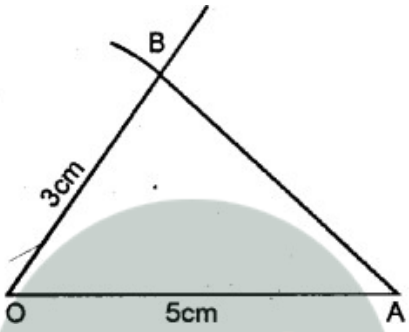
EXERCISE 25 (D)

Question 1.

Draw a line segment OA = 5 cm. Use set-square to construct angle AOB = 60°, such that OB = 3 cm. Join A and B ; then measure the length ofAB.

Solution:

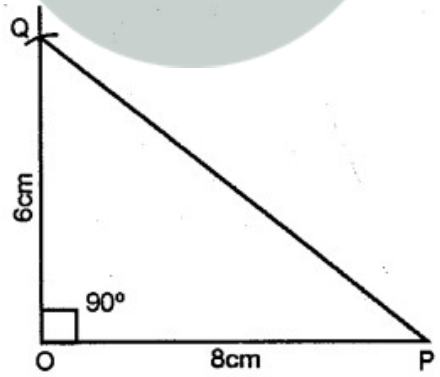
Measuring the length of AB = 4.4cm. (approximately)



Question 2.

Draw a line segment OP = 8cm. Use set-square to construct ∠POQ = 90°; such that OQ = 6 cm. Join P and Q; then measure the length of PQ.

Solution:

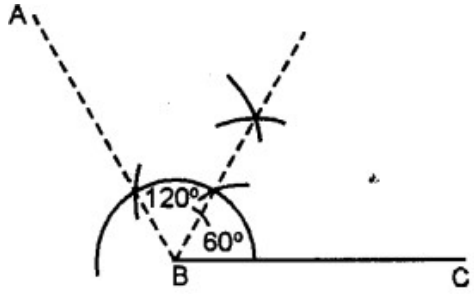


Measuring PQ = 10 cm.

Question 3.

Draw ∠ABC = 120°. Bisect the angle using ruler and compasses. Measure each angle so obtained and check whether or not the new angles obtained on bisecting ∠ABC are equal.

Solution:

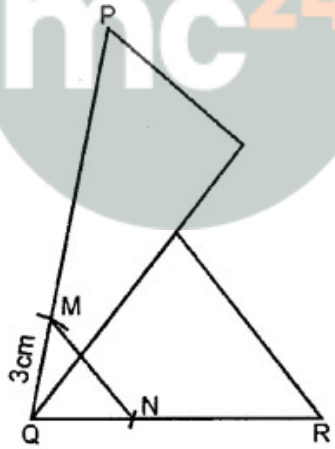


Measuring each angle = 60°
Yes, angles obtained in ∠ABC bisecting are equal.

Question 4.

Draw ∠PQR = 75° by using set- squares. On PQ mark a point M such that MQ = 3 cm. On QR mark a point N such that QN = 4 cm. Join M and N. Measure the length of MN.

Solution:



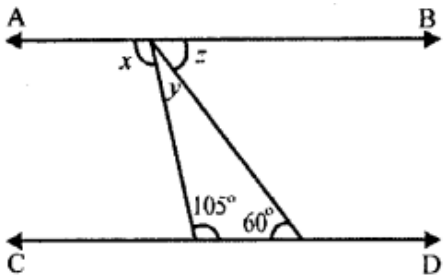
Length of MN = 4·3 cm

REVISION EXERCISE

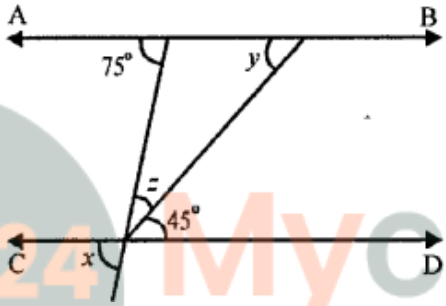
Question 1.

In the following figures, AB is parallel to CD; find the values of angles x, y and z :

(*i*)

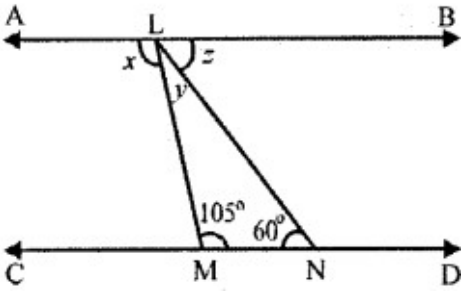


(*ii*)



Solution:

(*i*) In the figure (*i*)



AB ∥ CD

and LM is its transversal

$\therefore \angle ALM = \angle LMN$ (Alternate angles)

$\Rightarrow \angle x = 105°$

$\therefore x = 105°$

Similarly AB ∥ CD and LN is its transversal

$\therefore \angle BLN = \angle LNM$ (Alternate angles)

$\therefore \angle z = 60°$

$\therefore z = 60°$

But $x + y + z = 180°$ (Straight line angles)

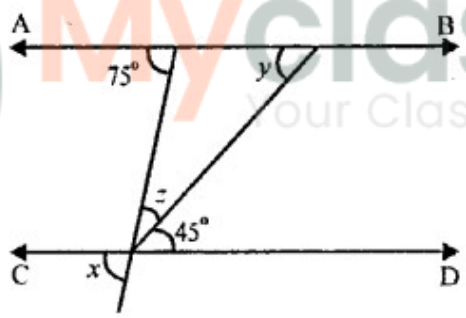
$\Rightarrow 105° + y + 60° = 180°$

$\Rightarrow y + 165° = 180°$

$\Rightarrow y = 180° - 165° = 15°$

Hence $x = 105°$, $y = 15°$ and $z = 60°$

(*ii*) In figure (*ii*)



AB ∥ CD

MN is its transversal

$\therefore \angle LNM = \angle NMD$ (Alternate angles)

$= y = 45°$

and AB ∥ CD and LM is its transversal

$\therefore \angle ALM = \angle CMP$ (Corresponding angles)

$\Rightarrow 75° = x$

$\therefore x = 75°$

and $\angle ALM = \angle LMD$ (Alternate angles)

$\therefore 75° = z + 45°$

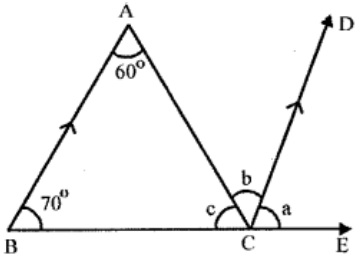
$\Rightarrow z = 75° - 45° = 30°$

Hence $x = 75°$, $y = 45°$ and $z = 30°$

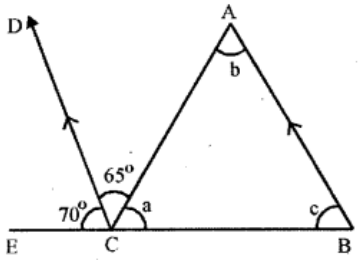
Question 2.

In each of the following figures, BA is parallel to CD. Find the angles a, b and c:

(i)



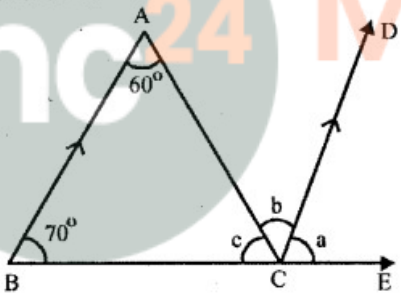
(ii)



Solution:

(*i*) In the figure (*i*)

ABC is a triangle and CD || BA, BC is produced to E



$\angle A = 60°, \angle B = 70°$

$\because$ AB || DC and BE is its transversal

$\therefore \angle DCE = \angle ABC$ (corresponding angles)

$\Rightarrow a = 70°$

$\therefore a = 70°$

Similarly, AB || DC and AC is its transversal

$\therefore \angle ACD = \angle BAC$ (Alternate angles)

$\Rightarrow b = 60°$

$\therefore b = 60°$

But $a + b + c = 180°$ (Straight line angle)

$\Rightarrow 70° + 60° + c = 180°$

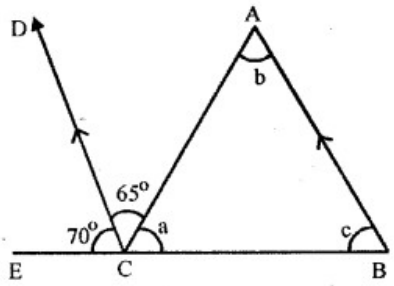
$\Rightarrow 130° + c = 180°$

$\Rightarrow c = 180° - 130° = 50°$

Hence $a = 70°$, $b = 60°$ and $\angle c = 50°$

(*ii*) In figure (*ii*),

AB || DC and AC is its transversal



$\therefore$ $\angle BAC = \angle ACD$ (Alternate angles)

$\Rightarrow$ $b = 65°$

Again AB || DC and BCE is its transversal

$\therefore$ $\angle ABC = \angle DCE$

$\Rightarrow$ $C = 70°$

But $\angle ACB + \angle ACD + \angle DCE = 180°$ (Straight line angle)

$\therefore$ $a + 65° + 70° = 180°$

$\Rightarrow$ $a + 135° = 180°$

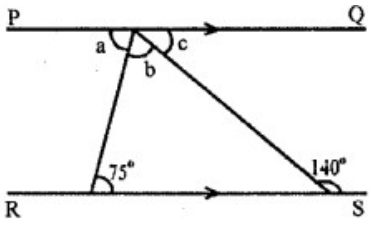
$\Rightarrow$ $a = 180° - 135° = 45°$

Hence $a = 45°$, $b = 65°$ and $c = 70°$

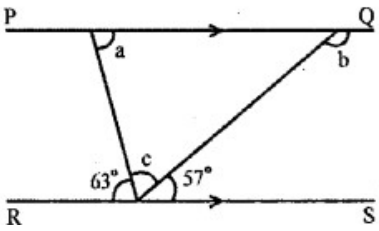
Question 3.

In each of the following figures, PQ is parallel to RS. Find the angles a, b and c:

(*i*)



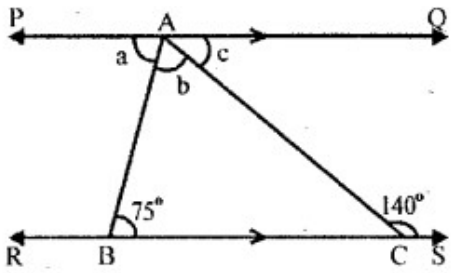
(*ii*)



Solution:

(*i*) In the figure (*i*),

PQ || RS, ∠B = 75°, ∠ACS = 140°



AB is its transversal

∴ ∠PAB = ∠ABC

⇒ $a = 75°$

Again PQ || RS and AC is its transversal

∴ ∠QAC + ∠ACS = 180° (Co-interior angles)

⇒ $c + 140° = 180°$

⇒ $c = 180° - 140° = 40°$

But $a + b + c = 180°$ (Straight line angles)

∴ $75° + b + 40° = 180°$

⇒ $b + 115° = 180°$

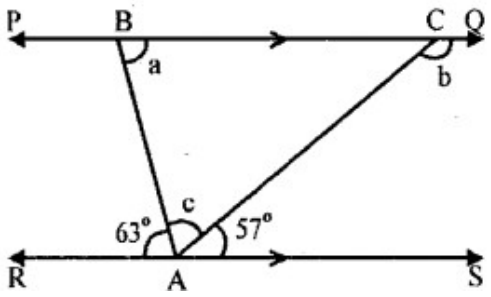
⇒ $b = 180° - 115° = 65°$

Hence $a = 75°$, $b = 65°$, $c = 40°$

(*ii*) In the figure (*ii*),

PQ || RS.

∴ ∠BAR = 63°, CAS = 57°



$\because$ PQ $\parallel$ RS and AB is its transversal

AB is its transversal.

$\therefore$ $\angle CBA = \angle BAR$ (Alternate angles)

$\Rightarrow$ $a = 63°$

$\because$ PQ $\parallel$ RS and CA is its transversal.

$\therefore$ $\angle QCA + \angle CAS = 180°$ (Co-interior angles)

$\Rightarrow$ $b + 57° = 180°$

$\Rightarrow$ $b = 180° - 57° = 123°$

But $\angle CAS + \angle CAB + \angle BAR = 180°$

(Straight line angles)

$\Rightarrow$ $57° + c + 63° = 180°$

Question 4.

Two straight lines are cut by a transversal. Are the corresponding angles always equal?

Solution:

If a transversal cuts two straight lines, their the corresponding angles are not equal unless the lines are not parallel. One in case of parallel lines, the corresponding angles are equal.

Question 5.

Two straight lines are cut by a transversal so that the co-interior angles are supplementary. Are the straight lines parallel ?

Solution:

A transversal intersects two straight lines and co-interior angles are supplementary

$\therefore$ By deflations, the lines will be parallel.

Question 6.

Two straight lines are cut by a transversal so that the co-interior angles are equal. What must be the measure of each interior angle to make the straight lines parallel to each other ?

Solution:

A transveral intersects two straight lines and co-interior angles are equal to each other,

$\because$ The two straight lines are parallel Their sum of co-interior angles = 180°

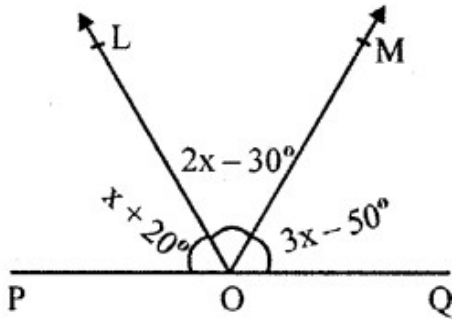
But both angles are equal

$\therefore$ Each angle will be $\frac{180}{2}°$ = 90°

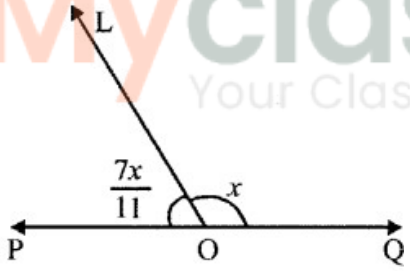
Question 7.

In each case given below, find the value of x so that POQ is straight line

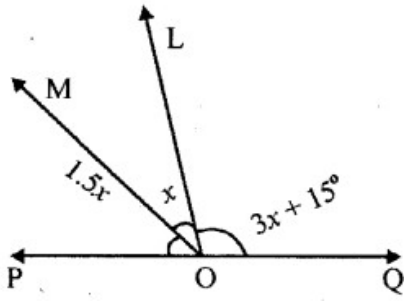
(i)



(ii)



(iii)



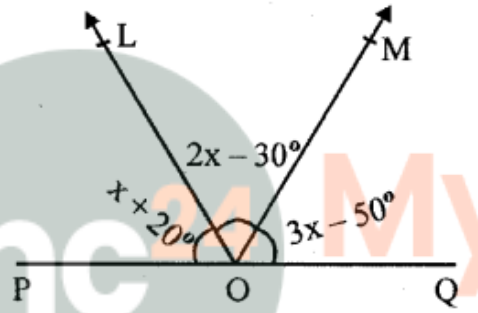
In each case, POQ is a straight line

(*i*) In figure (*i*)

$\because$ POQ is a straight line

$\therefore$ $\angle POL + \angle LOM + \angle MOQ = 180°$

(Straight line angles)



$\Rightarrow x + 20° + 2x - 30° + 3x - 50° = 180°$

$\Rightarrow 6x + 20° - 80° = 180° \Rightarrow 6x - 60° = 180°$

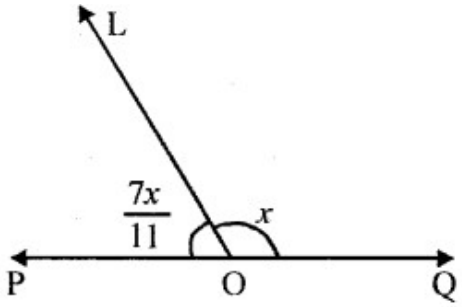
$\Rightarrow 6x = 180° + 60° = 240° \Rightarrow x = \frac{240°}{6}$

$\Rightarrow x = 40°$

$\therefore x = 40°$

(*ii*) $\because$ POQ is a straight line

$\therefore$ $\angle POL + \angle LOQ = 180°$



$$\Rightarrow \frac{7x}{11} + x = 180^\circ$$

$$\Rightarrow \frac{7x+11x}{11} = 180^\circ$$

$$\Rightarrow \frac{18x}{11} = 180^\circ$$

$$\Rightarrow x = \frac{180^\circ \times 11}{18} = 110^\circ$$

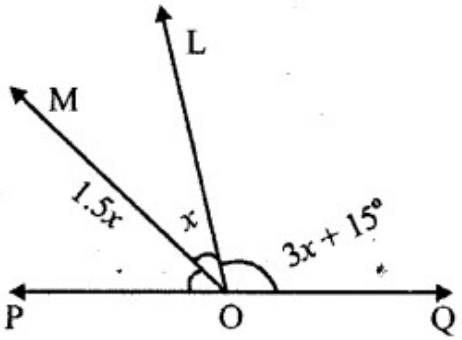
$\therefore\ x = 110^\circ$

(*iii*) $\because$ POQ is a straight line

$\therefore\ \angle POM + \angle MOL + \angle LOQ = 180^\circ$

$\Rightarrow 1.5x + x + 3x + 15^\circ = 180^\circ$

(Straight line angle)



$$5.5x + 15° = 180°$$

$$\Rightarrow 5.5x = 180° - 15°$$

$$\Rightarrow 5.5x = 165°$$

$$\Rightarrow x = \frac{165}{5.5} = \frac{165 \times 10}{55} = 30$$

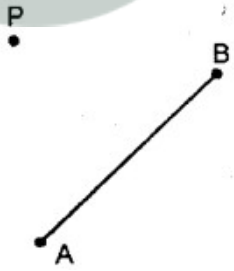
$$\therefore x = 30°$$

Question 8.

in each case, given below, draw perpendicular to AB from an exterior point P

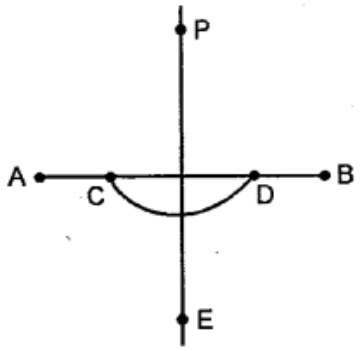
(*i*)

(*ii*)



Solution:

(*i*)



Steps of Construction :

1. From point P, draw an arc CD at line AB
2. From point C and D draw arcs which intersect each other at point E, now draw PE, perpendicular to AB.

(*ii*)

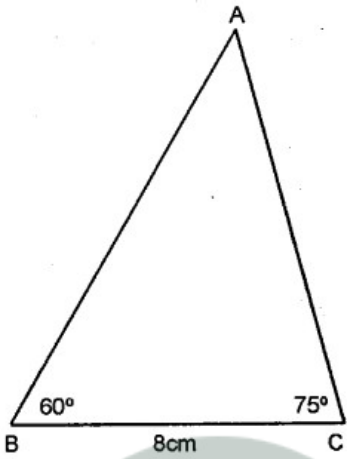
Steps of Construction :

1. From point P, draw an arc CD at line AB.
2. From point C and D draw arcs which intersect each other at Point E, now draw PE, perpendicular to AB.

Question 9.

Draw a line segment BC = 8 cm. Using set-squares, draw ∠CBA = 60° and ∠BCA = 75°. Measure the angle BAC. Also measure the lengths of AB and AC.

Solution:



Length AB = 11cm

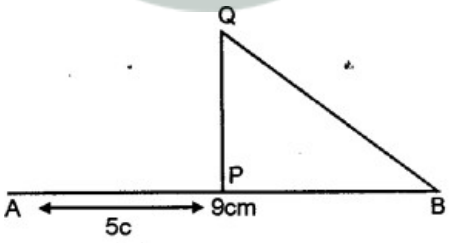
Length AC = 9·8cm

∠BAC = 45°.

Question 10.

Draw a line AB = 9 cm. Mark a point P in AB such that AP=5 cm. Through P draw (using set-square) perpendicular PQ = 3 cm. Measure BQ.

Solution:



BQ = 5 cm.

Question 11.

Draw a line segment AB = 6 cm. Without using set squares, draw angle OAB = 60° and angle OBA = 90°. Measure angle AOB and write this measurement.

Solution:

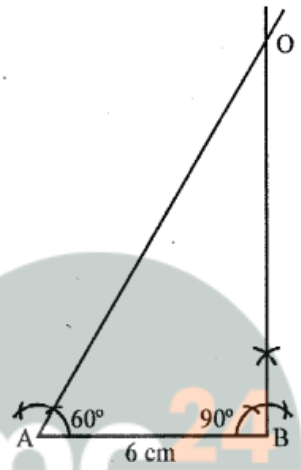
Steps of construction :

(*i*) Draw a line segment AB = 6 cm.

(*ii*) At A, draw a ray making an angle of 60° with the help of compass.

(*iii*) At B, draw another ray making an angle of 90° which meet each other at O.

Now on measuring ∠AOB, it is 30°



Question 12.

Without using set squares, construct angle ABC = 60° in which AB = BC = 5 cm. Join A and C and measure the length of AC.

Solution:

Steps of construction :

(*i*) Draw a angle ABC = 60°.
Such that AB = BC = 5 cm.

(*ii*) Join AC, on measuring, the length of AC = 5 cm.