EXERCISE 14A

1. State, true or false:
(i) A line segment 4 cm long can have only 2000 points in it.
(ii) A ray has one end point and a line segment has two end-points.
(iii) A line segment is the shortest distance between any two given points.
(iv) An infinite number of straight lines can be drawn through a given point.
(v) Write the number of end points in
(a) a line segment AB (b) a ray AB (c) a line AB
(vi) Out of $\overleftrightarrow{AB}, \overrightarrow{AB}, \overleftarrow{AB}\ and\ \overline{AB}$ **which one has a fixed length?**
(vii) How many rays can be drawn through a fixed point O?
(viii) How many lines can be drawn through three
(a) collinear points?
(b) non-collinear points?
(ix) Is 40° the complement of 60°?
(x) Is 45° the supplement of 45°?
Solution:

(i) False.
It contains infinite number of points.

(ii) True.

(iii) True.

(iv) True.

(v) (a) 2 (b) 1 (c) 0

(vi) AB has fixed length.

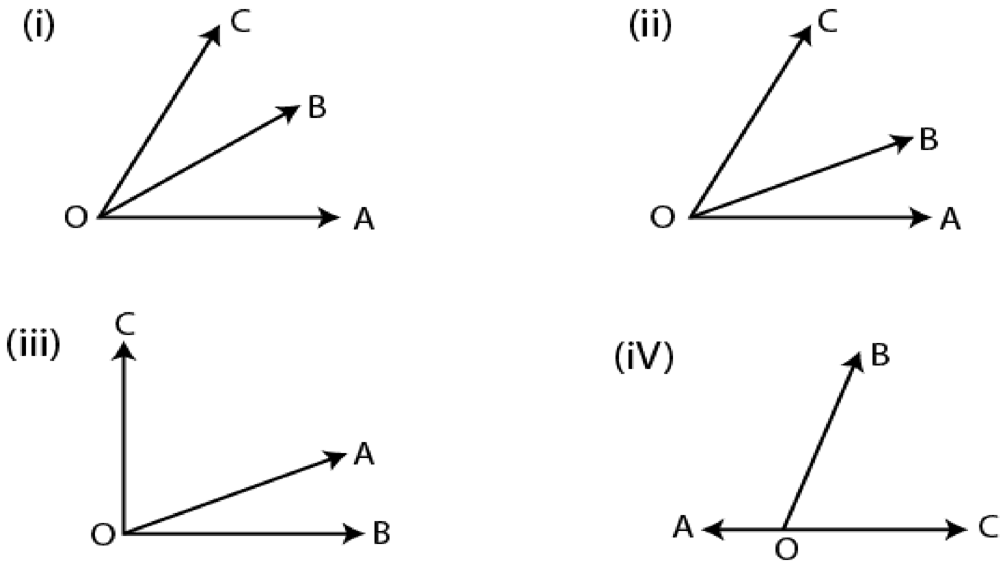
(vii) Infinite rays can be drawn through a fixed point O.

(viii) (a) 1 line can be drawn through three collinear points.
(b) 3 lines can be drawn through three non-collinear points.

(ix) False.
40^o is the complement of 50^o as $40^o + 50^o = 90^o$

(x) False.
45^o is the supplement of 135^o not 45^o.

2. In which of the following figures, are ∠AOB and ∠AOC adjacent angles? Give, in each case, reason for your answer.



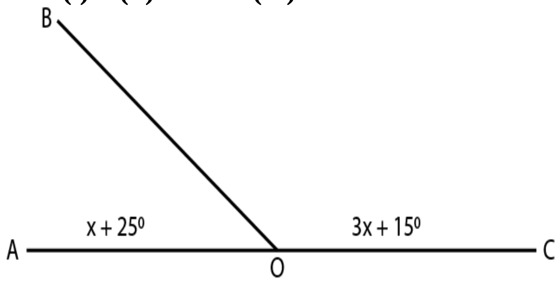
Solution:

If ∠AOB and ∠AOC are adjacent angle, they have OA as their common arm.
(i) From the figure
OB is the common arm
∠AOB and ∠AOC are not adjacent angles.
(ii) From the figure
OC is the common arm
∠AOB and ∠AOC are not adjacent angles.

(iii) From the figure
OA is the common arm
∠AOB and ∠AOC are adjacent angles.

(iv) From the figure
OB is the common arm
∠AOB and ∠AOC are not adjacent angles.

3. In the given figure, B AC is a straight line.
Find: (i) x (ii) ∠AOB (iii) ∠BOC



Solution:

We know that
∠AOB and ∠COB are linear pairs
It can be written as

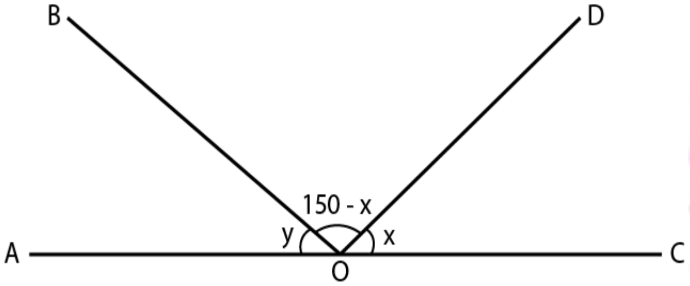
$\angle AOB + \angle COB = 180^o$
Substituting the values
$x + 25^o + 3x + 15^o = 180^o$
By further calculation
$4x + 40^o = 180^o$
So we get
$4x = 180 – 40 = 140^o$

(i) $x = 140/4 = 35^o$

(ii) $\angle AOB = x + 25$
Substituting the value of x
$\angle AOB = 25 + 35 = 60^o$

(iii) $\angle BOC = 3x + 15^o$
Substituting the value of x
$\angle BOC = (3 \times 35) + 15$
$\angle BOC = 120^o$

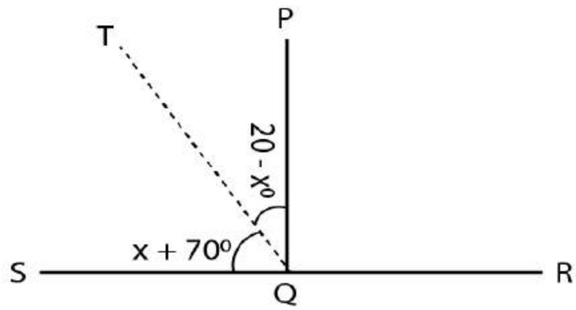
4. Find y in the given figure.



Solution:

Here AOC is a straight line
We can write it as
$\angle AOB + \angle BOD + \angle DOC = 180^o$
Substituting the values
$y + 150 – x + x = 180$
By further calculation
$y + 150 = 180$
So we get
$y = 180 – 150 = 30^o$

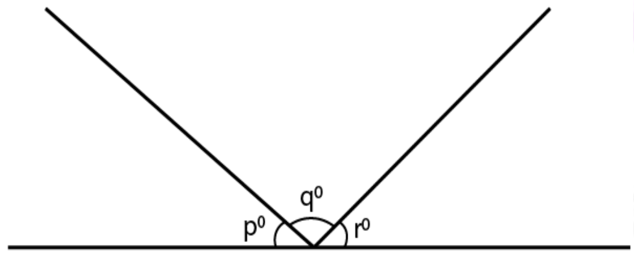
5. In the given figure, find ∠PQR.



Solution:

Here SQR is a straight line
We can write it as
$\angle SQT + \angle TQP + \angle PQR = 180^o$
Substituting the values
$x + 70 + 20 – x + \angle PQR = 180^o$
By further calculation
$90^o + \angle PQR = 180^o$
So we get
$\angle PQR = 180^o – 90^o = 90^o$

6. In the given figure, $p^o = q^o = r^o$, find each.

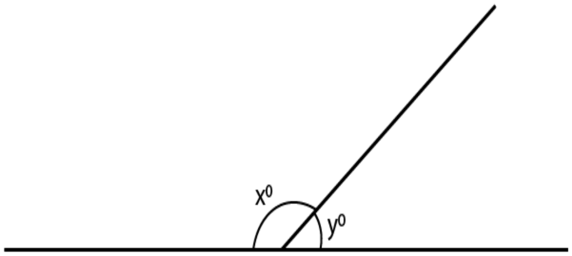


Solution:

We know that
$p^o + q^o + r^o = 180^o$ is a straight angle
It is given that
$p^o = q^o = r^o$
We can write it as
$p^o + p^o + p^o = 180^o$
$3p = 180$
$p = 180/3 = 60^o$

Therefore, $p^o = q^o = r^o = 60^o$

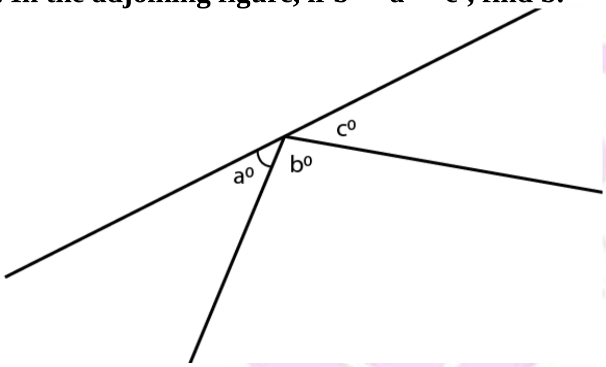
7. In the given figure, if x = 2y, find x and y.



Solution:

It is given that
x = 2y
For a straight angle
$x^o + y^o = 180^o$
Substituting the values
2y + y = 180
By further calculation
3y = 180
$y = 180/3 = 60^o$
$x = 2y = 2 \times 60^o = 120^o$

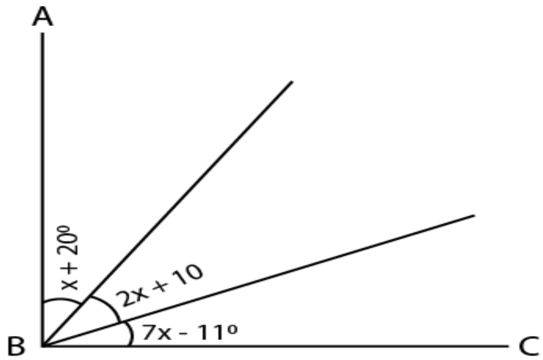
8. In the adjoining figure, if $b^o = a^o + c^o$, find b.



Solution:

It is given that
$b^o = a^o + c^o$
For a straight angle
$a^o + b^o + c^o = 180^o$
Substituting the values
$b^o + b^o = 180^o$
$2b^o = 180^o$
$b^o = 180/2 = 90^o$

9. In the given figure, AB is perpendicular to BC at B.
Find : (i) the value of x.
(ii) the complement of angle x.



Solution:

(i) From the figure
AB || BC at B
Here ∠ABC = 90°
Substituting the values
x + 20 + 2x + 1 + 7x – 11 = 90
By further calculation
10x + 10 = 90
10x = 90 – 10 = 80
x = 80/10 = 8°

(ii) The complement of angle x = 90 – x
So we get
= 90 – 8 = 82°

10. Write the complement of:
(i) 25°
(ii) 90°
(iii) a°
(iv) (x + 5)°
(v) (30 – a)°
(vi) ½ of a right angle
(vii) 1/3 of 180°
(viii) 21° 17'
Solution:

(i) The complement of 25° = 90° – 25° = 65°

(ii) The complement of 90° = 90° – 90° = 0

(iii) The complement of a° = 90° - a°

(iv) The complement of (x + 5)° = 90° – (x + 5)°
By further calculation
= 90° – x – 5°
= 85° – x

(v) The complement of (30 – a)° = 90° – (30 – a)°

By further calculation
$= 90^o – 30^o + a^o$
$= 60^o + a^o$

(vi) The complement of ½ of a right angle = 90^o – ½ of a right angle
So we get
$= 90^o – ½ \times 90^o$
$= 90^o – 45^o$
$= 45^o$

(vii) The complement of 1/3 of $180^o = 90^o$ – 1/3 of 180^o
By further calculation
$= 90^o – 60^o$
$= 30^o$

(viii) The complement of 21^o 17' = 90^o - 21^o 17'
So we get
= 68^o 43'

11. Write the supplement of:
(i) 100°
(ii) 0°
(iii) x°
(iv) (x + 35)°
(v) (90 +a + b)°
(vi) (110 – x – 2y)°
(vii) 1/5 of a right angle
(viii) 80° 49′ 25″
Solution:

(i) The supplement of 100° = 180 – 100 = 80^0

(ii) The supplement of 0° = 180 – 0 = 180^o

(iii) The supplement of x° = $180^0 – x^0$

(iv) The supplement of (x + 35)° = $180^0 – (x + 35)^0$
We can write it as
= 180 – x – 35
$= 145^0 – x^0$

(v) The supplement of (90 + a + b)° = $180^0 – (90 + a + b)^0$
We can write it as
= 180 – 90 – a – b
So we get
$= 90^0 – a^0 – b^0$
$= (90 – a – b)^0$

(vi) The supplement of (110 – x – 2y)° = 180^0 – (110 – x – 2y)°
We can write it as

= 180 – 110 + x + 2y
= $70^0 + x^0 + 2y^0$

(vii) The supplement of 1/5 of a right angle = 180^0 – 1/5 of a right angle
We can write it as
= $180^0 – 1/5 \times 90^0$
So we get
= $180^0 - 18^0$
= 162^0

(viii) The supplement of 80° 49′ 25″ = 180^0 - 80° 49′ 25″
We know that 1^0 = 60’ and 1’ = 60”
So we get
= 99^0 10’ 35”

12. Are the following pairs of angles complementary?
(i) 10° and 80°
(ii) 37° 28′ and 52° 33′
(iii) (x+ 16)°and (74 - x)°
(iv) 54° and 2/5 of a right angle.
Solution:

(i) 10° and 80°
Yes, they are complementary angles as their sum = $10^0 + 80^0 = 90^0$

(ii) 37° 28′ and 52° 33′
No, they are not complementary angles as their sum is not equal to 90^0
37° 28′ + 52° 33′ = $90^0$1’

(iii) (x+ 16)° and (74 - x)°
Yes, they are complementary angles as their sum = x + 16 + 74 – x = 90^0

(iv) 54° and 2/5 of a right angle
We can write it as
= 54^0 and $2/5 \times 90^0$
= 54^0 and 36^0
Yes, they are complementary angles as their sum = 54 + 36 = 90^0

13. Are the following pairs of angles supplementary?
(i) 139^o and 39^o
(ii) 26^o59’ and 153^o1’
(iii) 3/10 of a right angle and 4/15 of two right angles
(iv) $2x^o + 65^o$ and $115^o – 2x^o$
Solution:

(i) 139^o and 39^o
No, they are not supplementary angles as their sum is not equal to 180^0
$139^0 + 39^0 = 178^0$

(ii) 26^o59’ and 153^o1’

Yes, they are supplementary angles as their sum = $26^o 59' + 153^o 1' = 180^0$

(iii) 3/10 of a right angle and 4/15 of two right angles
We can write it as
= 3/10 of 90^0 and 4/15 of 180^0
= 27^0 and 48^0
No, they are not supplementary angles as their sum is not equal to 180^0

$27^0 + 48^0 = 75^0$

(iv) $2x^o + 65^o$ and $115^o – 2x^o$
Yes they are supplementary angles as their sum = 2x + 65 + 115 – 2x = 180^0

14. If 3x + 18° and 2x + 25° are supplementary, find the value of x.
Solution:

It is given that 3x + 18° and 2x + 25° are supplementary
We can write it as
$3x + 18° + 2x + 25° = 180^0$
By further calculation
$5x + 43^0 = 180^0$
So we get
$5x = 180 – 43 = 137^0$
$x = 137/5 = 27.4^0$ or $27^0\ 24'$

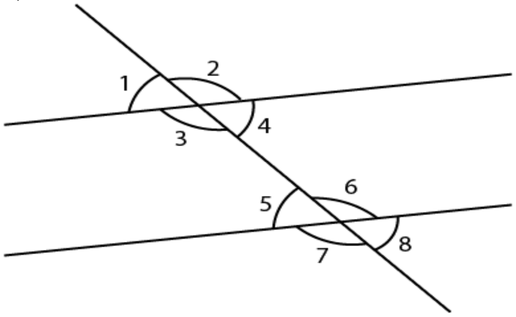
15. If two complementary angles are in the ratio 1:5, find them.
Solution:

It is given that two complementary angles are in the ratio 1:5
Consider x and 5x as the angles
We can write it as
$x + 5x = 90^0$
$6x = 90^0$
So we get
$x = 90/6 = 15^0$
Here the angles will be 15^0 and $15 \times 5 = 75^0$

EXERCISE 14B PAGE: 166

1. In questions 1 and 2, given below, identify the given pairs of angles as corresponding angles, interior alternate angles, exterior alternate angles, adjacent angles, vertically opposite angles or allied angles:

(i) ∠3 and ∠6
(ii) ∠2 and ∠4
(iii) ∠3 and ∠7
(iv) ∠2 and ∠7
(v) ∠4 and∠6
(vi) ∠1 and ∠8
(vii) ∠1 and ∠5
(viii) ∠1 and ∠4
(ix) ∠5 and ∠7



Solution:

(i) ∠3 and ∠6 are interior alternate angles.

(ii) ∠2 and ∠4 are adjacent angles.

(iii) ∠3 and ∠7 are corresponding angles.

(iv) ∠2 and ∠7 are exterior alternate angles.

(v) ∠4 and∠6 are allied or co-interior angles.

(vi) ∠1 and ∠8 are exterior alternate angles.

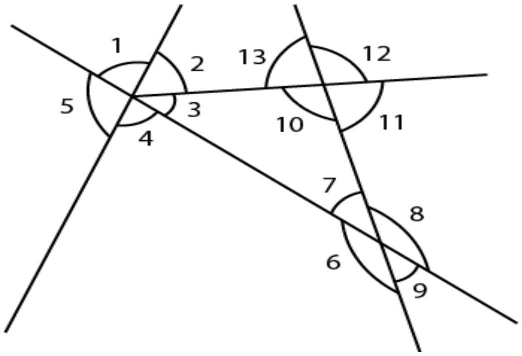
(vii) ∠1 and ∠5 are corresponding angles.

(viii) ∠1 and ∠4 are vertically opposite angles.

(ix) ∠5 and ∠7 are adjacent angles.

2. (i) ∠1 and ∠4
(ii) ∠4 and ∠7
(iii) ∠10 and ∠12
(iv) ∠7 and ∠13
(v) ∠6 and ∠8
(vi) ∠11 and ∠8
(vii) ∠7 and ∠9
(viii) ∠4 and ∠5

(ix) ∠4 and ∠6
(x) ∠6 and ∠7
(xi) ∠2 and ∠13



Solution:

(i) ∠1 and ∠4 are vertically opposite angles.

(ii) ∠4 and ∠7 are interior alternate angles.

(iii) ∠10 and ∠12 are vertically opposite angles.

(iv) ∠7 and ∠13 are corresponding angles.

(v) ∠6 and ∠8 are vertically opposite angles.

(vi) ∠11 and ∠8 are allied or co-interior angles.

(vii) ∠7 and ∠9 are vertically opposite angles.

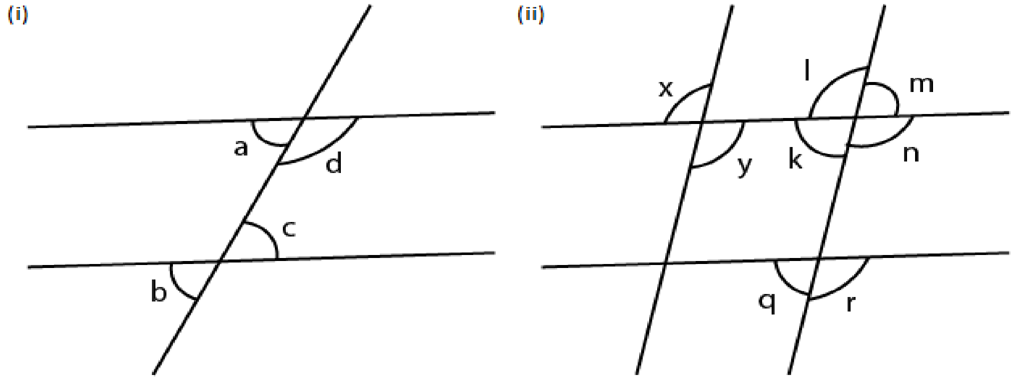
(viii) ∠4 and ∠5 are adjacent angles.

(ix) ∠4 and ∠6 are allied or co-interior angles.

(x) ∠6 and ∠7 are adjacent angles.

(xi) ∠2 and ∠13 are allied or co-interior angles.

3. In the following figures, the arrows indicate parallel lines. State which angles are equal. Give reasons.

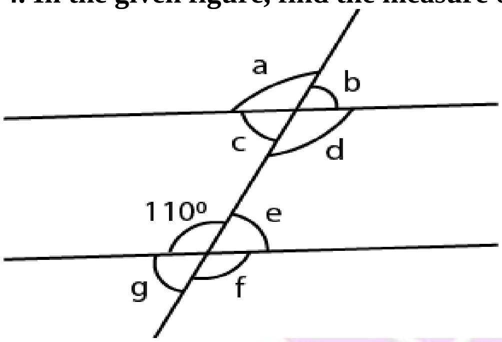


Solution:

(i) From the figure (i)
a = b are corresponding angles
b = c are vertically opposite angles
a = c are alternate angles
So we get
a = b = c

(ii) From the figure (ii)
x = y are vertically opposite angles
y = l are alternate angles
x = l are corresponding angles
1 = n are vertically opposite angles
n = r are corresponding angles
So we get
x = y = l = n = r
Similarly
m = k are vertically opposite angles
k = q are corresponding angles
Hence, m = k = q.

4. In the given figure, find the measure of the unknown angles:



Solution:

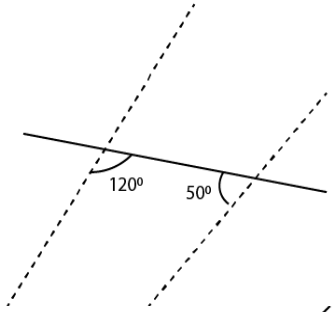
From the figure
a = d are vertically opposite angles
d = f are corresponding angles
$f = 110^0$ are vertically opposite angles
So we get
$a = d = f = 110^0$
We know that
$e + 110^0 = 180^0$ are co-interior angles
$e = 180 – 110 = 70^0$

b = c are vertically opposite angles
b = e are corresponding angles
e = g are vertically opposite angles
So we get
$b = c = e = g = 70^0$

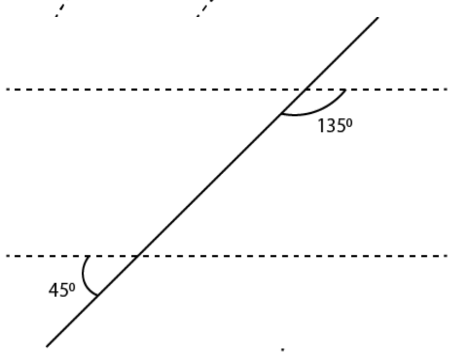
Therefore, a = 110^0, b = 70^0, c = 70^0, d = 110^0, e = 110^0, f = 110^0 and g = 70^0.

5. Which pair of the dotted line, segments, in the following figures, are parallel. Give reason:

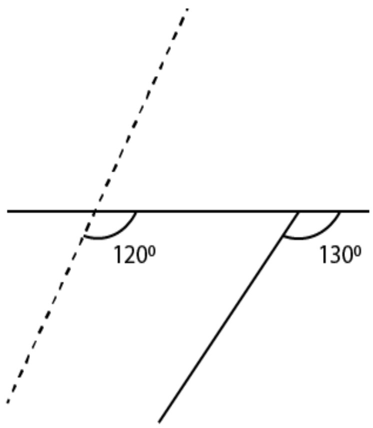
i)



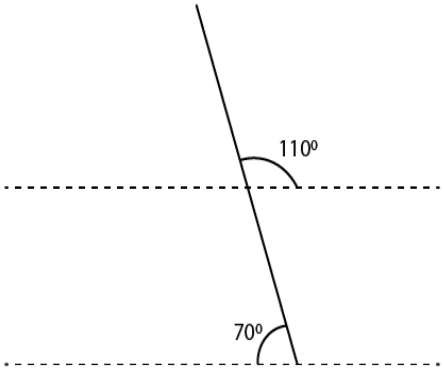
ii)



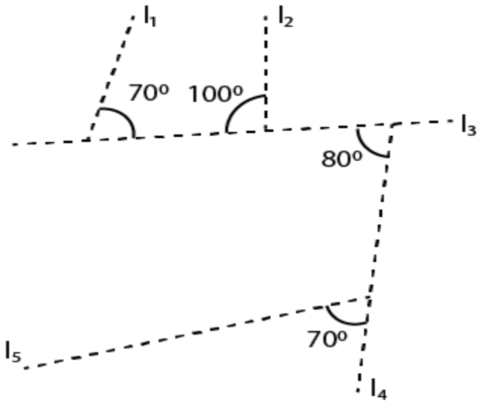
iii)



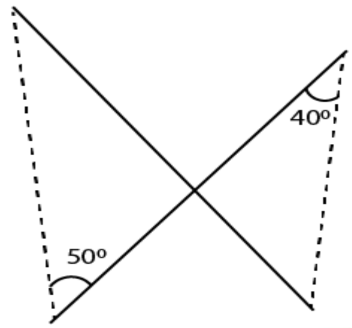
iv)



v)



vi)



Solution:

(i) From the figure (i)
If the lines are parallel we get 120 + 50 = 180^0
There are co-interior angles where $170^0 = 180^0$
It is not true.
Therefore, they are not parallel lines.

(ii) From the figure (ii)
$\angle 1 = 45^0$ are vertically opposite angles
We know that the lines are parallel if
$\angle 1 + 135^0 = 180^0$ are co-interior angles
Substituting the values
$45^0 + 135^0 = 180^0$
$180^0 = 180^0$ which is true
Therefore, the lines are parallel.

(iii) From the figure (iii)
The lines are parallel if corresponding angles are equal
Here $120^0 = 130^0$ is not correct
Hence, lines are not parallel.

(iv) $\angle 1 = 110^0$ are vertically opposite angles
We know that if lines are parallel
$\angle 1 + 70^0 = 180^0$ are co-interior angles
Substituting the values
$110^0 + 70^0 = 180^0$
$180^0 = 180^0$ which is correct

Therefore, the lines are parallel.

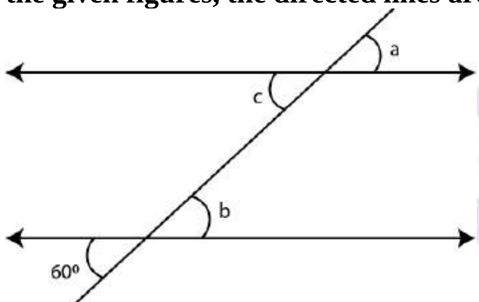
(v) $\angle 1 + 100^0 = 180^0$
So we get
$\angle 1 = 180^0 - 100^0 = 80^0$ which is a linear pair
Here the lines 1 and 2 are parallel if $\angle 1 = 70^0$
$80^0 = 70^0$ is not true
So the $\angle 1$ and $\angle 2$ are not parallel
$\angle 3$ and $\angle 5$ will be parallel if $80^0 = 70^0$ are corresponding angle which is not true.
Hence, $\angle 3$ and $\angle 5$ are not parallel.

We know that
$\angle 1 = 80^0$ are alternate angles
$80^0 = 80^0$ which is true
Hence, $\angle 2$ and $\angle 4$ are parallel.

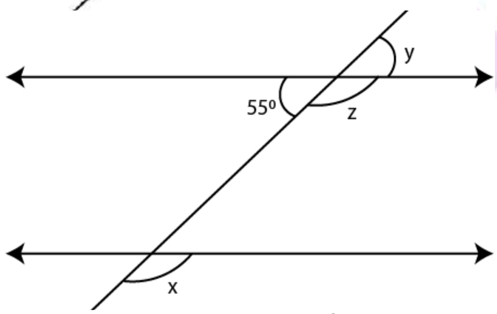
(vi) Two lines are parallel if alternate angles are equal
$50^0 = 40^0$ which is not true
Hence, the lines are not parallel.

6. In the given figures, the directed lines are parallel to each other. Find the unknown angles.

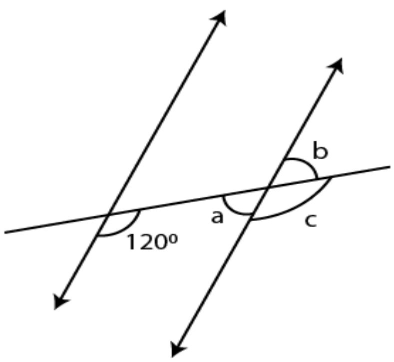
i)



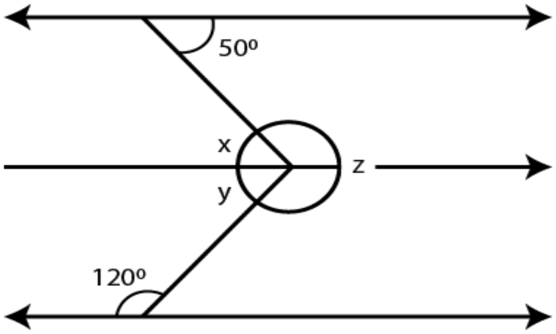
ii)



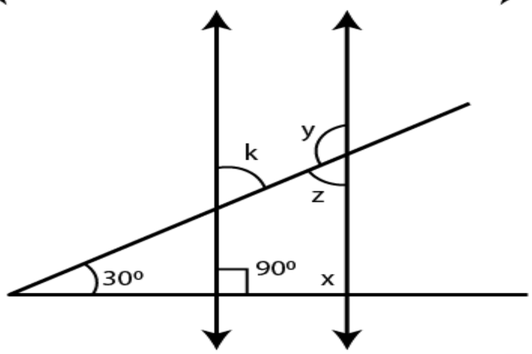
iii)



iv)



v)



Solution:

(i) If the lines are parallel
a = b are corresponding angles
a = c are vertically opposite angles
a = b = c
Here b = 60^0 are vertically opposite angles
Therefore, a = b = c = 60^0

(ii) If the lines are parallel
x = z are corresponding angles
z + y = 180^0 is a linear pair
y = 55^0 are vertically opposite angles
Substituting the values
z + 55^0 = 180^0
z = 180 – 55 = 125^0
If x = z we get x = 125^0
Therefore, x = 125^0, y = 55^0 and z = 125^0.

(iii) If the lines are parallel
c = 120^0
a + 120^0 = 180^0 are co-interior angles
a = 180 – 120 = 60^0
We know that a = b are vertically opposite angles
So b = 60^0
Therefore, a = b = 60^0 and c = 120^0.

(iv) If the lines are parallel
x = 50^0 are alternate angles
y + 120^0 = 180^0 are co-interior angles

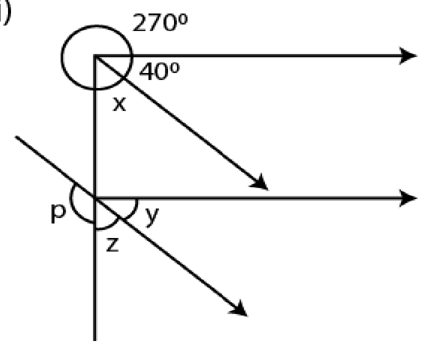
$y = 180 – 120 = 60^0$
We know that
$x + y + z = 360^0$ are angles at a point
Substituting the values
$50 + 60 + z = 360$
By further calculation
$110 + z = 360$
$z = 360 – 110 = 250^0$
Therefore, $x = 50^0$, $y = 60^0$ and $z = 250^0$.

(v) If the lines are parallel
$x + 90^0 = 180^0$ are co-interior angles
$x = 180^0 – 90^0 = 90^0$
$\angle 2 = x$
$\angle 2 = 90^0$
We know that the sum of angles of a triangle
$\angle 1 + \angle 2 + 30^0 = 180^0$
Substituting the values
$\angle 1 + 90^0 + 30^0 = 180^0$
By further calculation
$\angle 1 + 120^0 = 180^0$
$\angle 1 = 180 – 120 = 60^0$

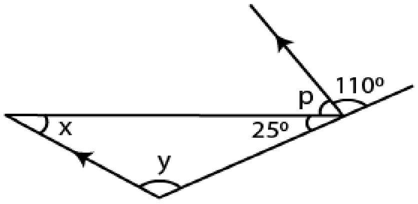
Here $\angle 1 = k$ are vertically opposite angles
$k = 60^0$
Here $\angle 1 = z$ are alternate angles
$z = 60^0$
Here $k + y = 180^0$ are co-interior angles
Substituting the values
$60^0 + y = 180^0$
$y = 180 – 60 = 120^0$
Therefore, $x = 90^0$, $y = 120^0$, $z = 60^0$, $k = 60^0$.

7. Find x, y and p is the given figures:

(i)



(ii)



Solution:

(i) From the figure (i)
The lines are parallel
$x = z$ are corresponding angles

$y = 40^0$ are corresponding angles
We know that
$x + 40^0 + 270^0 = 360^0$ are the angles at a point
So we get
$x + 310^0 = 360^0$
$x = 360 – 310 = 50^0$
So $z = x = 50^0$
Here $p + z = 180^0$ is a linear pair
By substituting the values
$p + 50^0 = 180^0$
$p = 180 – 50 = 130^0$

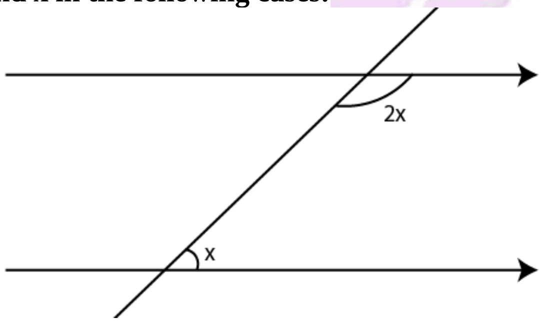
Therefore, $x = 50^0$, $y = 40^0$, $z = 50^0$ and $p = 130^0$.

(ii) From the figure (ii)
The lines are parallel
$y = 110^0$ are corresponding angles
We know that
$25^0 + p + 110^0 = 180^0$ are angles on a line
$p + 135^0 = 180^0$
$p = 180 – 135 = 45^0$

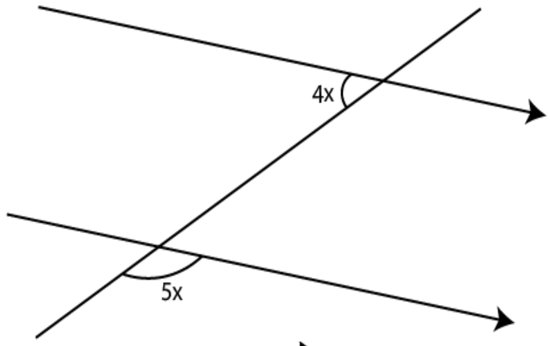
We know that the sum of angles of a triangle
$x + y + 25^0 = 180^0$
$x + 110^0 + 25^0 = 180^0$
By further calculation
$x + 135^0 = 180^0$
$x = 180 – 135 = 45^0$

Therefore, $x = 45^0$, $y = 110^0$ and $p = 45^0$.

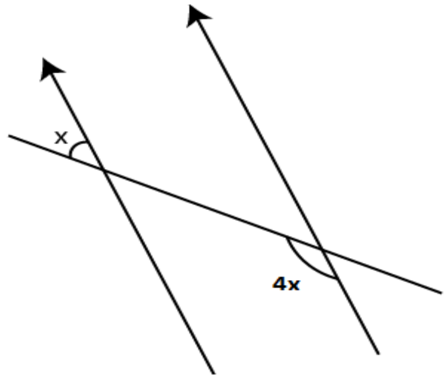
8. Find x in the following cases:
(i)



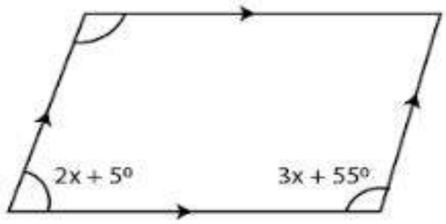
(ii)



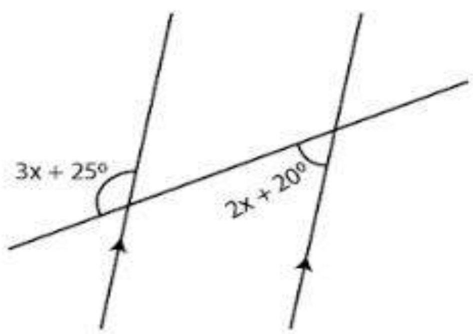
(iii)



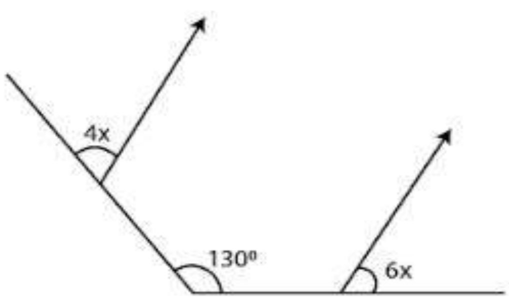
(iv)



(v)



(vi)



Solution:

(i) From the figure (i)
The lines are parallel
$2x + x = 180^0$ are co-interior angles
$3x = 180^0$
$x = 180/3 = 60^0$

(ii) From the figure (ii)
The lines are parallel
$4x + 1 = 180^0$ are co-interior angles
$\angle 1 = 5x$ are vertically opposite angles
Substituting the values
$4x + 5x = 180^0$
So we get
$9x = 180^0$
$x = 180/9 = 20^0$

(iii) From the figure (iii)
The lines are parallel
$\angle 1 + 4x = 180^0$ are co-interior angles
$\angle 1 = x$ are vertically opposite angles
Substituting the values
$x + 4x = 180^0$
$5x = 180^0$
So we get
$x = 180/5 = 36^0$

(iv) From the figure (iv)
The lines are parallel
$2x + 5 + 3x + 55 = 180^0$ are co-interior angles
$5x + 60^0 = 180^0$
By further calculation
$5x = 180 – 60 = 120^0$
So we get
$x = 120/5 = 24^0$

(v) From the figure (v)
The lines are parallel
$\angle 1 = 2x + 20^0$ are alternate angles
$\angle 1 + 3x + 25^0 = 180^0$ is a linear pair
Substituting the values
$2x + 20^0 + 3x + 25^0 = 180^0$
$5x + 45^0 = 180^0$
So we get
$5x = 180 – 45 = 135^0$
$x = 135/5 = 27^0$

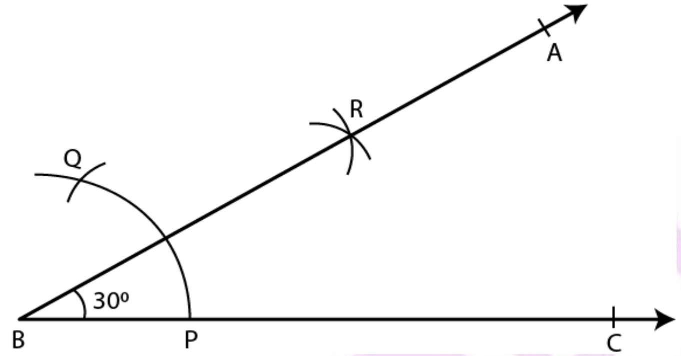
(vi) From the figure (vi)
Construct a line parallel to the given parallel lines
$\angle 1 = 4x$ and $\angle 2 = 6x$ are corresponding angles
$\angle 1 + \angle 2 = 130^0$

Substituting the values
$4x + 6x = 130^0$
$10x = 130^0$
So we get
$x = 130/10 = 13^0$

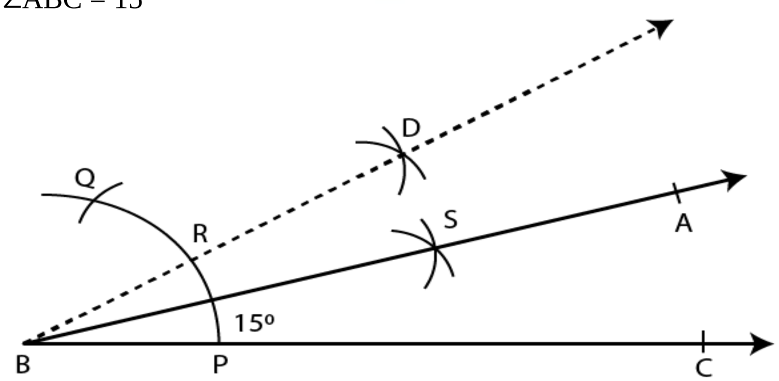
EXERCISE 14C

1. Using ruler and compasses, construct the following angles:
(i)30°
(ii)15°
(iii) 75°
(iv) 180°
(v) 165°
Solution:

(i) 30°
Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and a suitable radius construct an arc which meets BC at the point P.
3. Taking P as centre and same radius cut off the arc at the point Q.
4. Consider P and Q as centre construct two arcs which intersect each other at the point R.
5. Now join BR and produce it to point A forming ZABC = 30^0

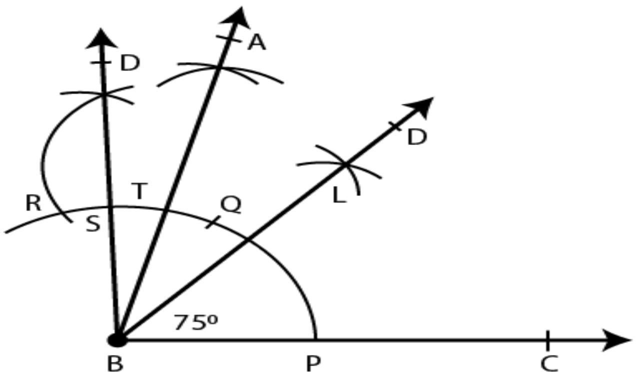


(ii) 15^0
Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and a suitable radius construct an arc which meets BC at the point P.
3. Taking P as centre and same radius cut off the arc at the point Q.
4. Consider P and Q as curves, construct two arcs which intersect each other at the point D and join BD.
5. Taking P and R as centre construct two more arcs which intersect each other at the point S.
6. Now join BS and produce it to point A.
∠ABC = 15^0

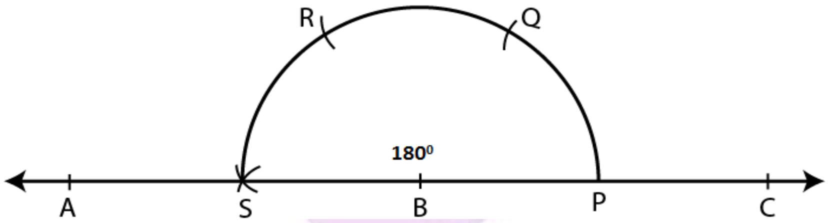


(iii) 75°

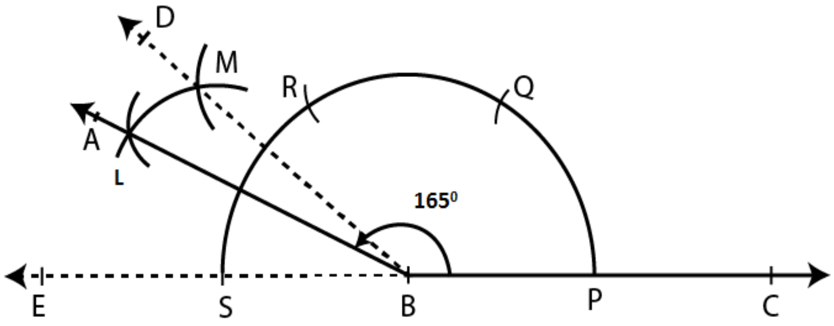
Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and suitable radius construct an arc and cut off PQ then QR of the same radius.
3. Taking Q and R as centre, construct two arcs which intersect each other at the point S.
4. Now join SB.
5. Taking Q and D as centre construct two arcs which intersect each other at the point T.
6. Now join BT and produce it to point A.
∠ABC = 75°



(iv) 180°
Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and some suitable radius construct an arc which meets BC at the point P.
3. Taking P as centre and with same radius cut off the arcs PQ, QR and RS.
4. Now join BS and produce it to point A.
∠ABC = 180°

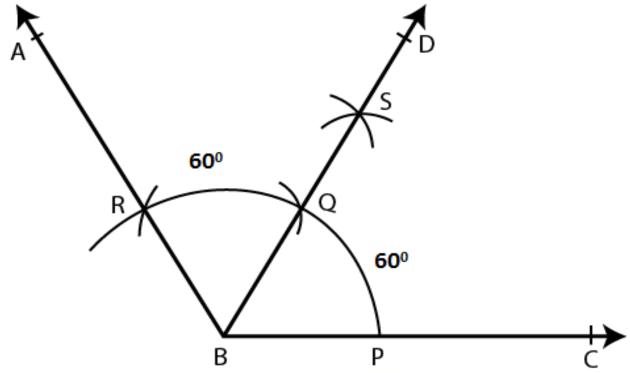


(v) 165°
Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and some suitable radius construct an arc which meets BC at the point P.
3. Taking P as centre and same radius cut off arcs at PQ, QR and then RS.
4. Now join SB.
5. Taking R and S as centres construct two arcs which intersect each other at the point M.
6. Taking T and S as centres construct two arcs which intersect each other at the point L.
7. Now join BL and produce it to point A.
∠ABC = 165°



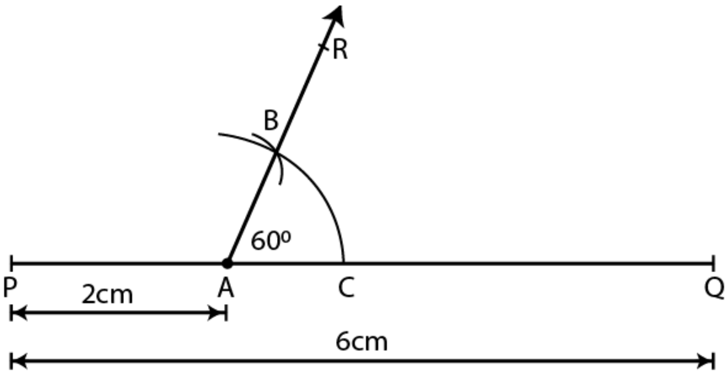
2. Draw ∠ABC = 120°. Bisect the angle using ruler and compasses only. Measure each angle so obtained and check whether the angles obtained on bisecting ∠ABC are equal or not.
Solution:

Steps of Construction:
1. Construct a line segment BC.
2. Taking B as centre and some suitable radius construct an arc which meets BC at the point P.
3. Taking P as centre and with same radius cut off the arcs PQ and QR.
4. Now join BR and produce it to point A
∠ABC = 120°
5. Taking P and R as centres construct two arcs which intersect each other at the point S.
6. Now join BS and produce it to point D.
Here BD is the bisector of ∠ABC
By measuring each angle we get to know that is it 60^0
Yes, both the angles are of equal measure.



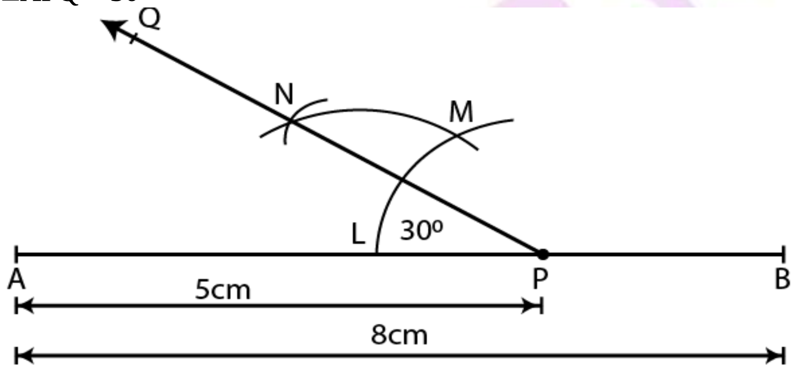
3. Draw a line segment PQ = 6 cm. Mark a point A in PQ so that AP = 2 cm. At point A, construct angle QAR = 60°.
Solution:

Steps of Construction:
1. Construct a line segment PQ = 6cm.
2. Now mark point A on PQ so that AP = 2 cm.
3. Taking A as centre and some suitable radius construct an arc which meets AQ at the point C.
4. Taking C as centre and with same radius cut the arc CB.
5. Now join AB and produce it to point R.
∠QAR = 60^0.

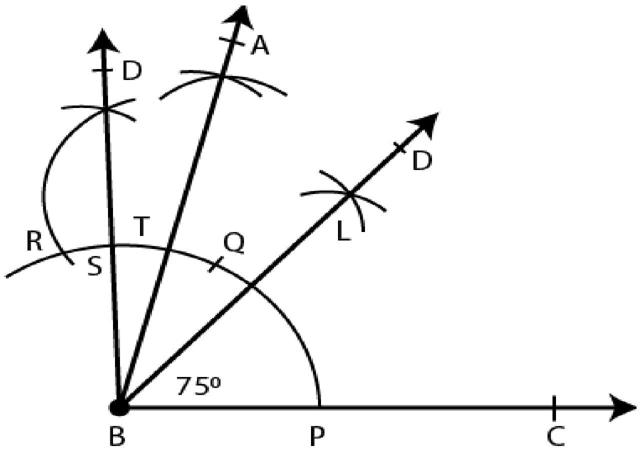


4. Draw a line segment AB = 8 cm. Mark a point P in AB so that AP = 5 cm. At P, construct angle APQ = 30°.
Solution:

Steps of Construction:
1. Construct a line segment AB = 8 cm.
2. Now mark the point P on AB such that AP = 5mc.
3. Taking P as centre and some suitable radius construct an arc which meets AB in L.
4. Taking L as centre and same radius cut the arc LM.
5. Now bisect the arc LM at the point N.
6. Join PN and produce it to point Q.
∠APQ = 30^0

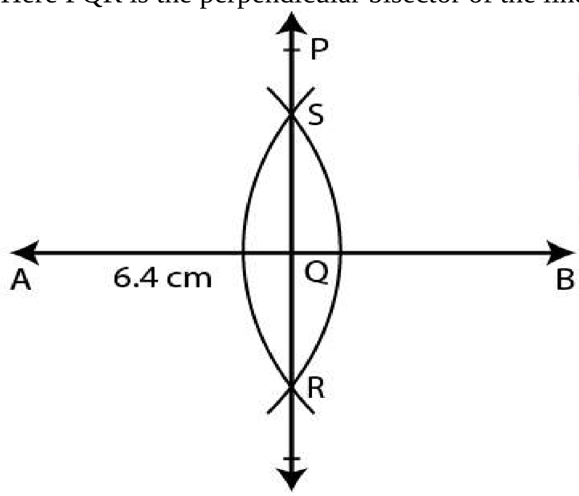


5. Construct an angle of 75° and then bisect it.
Solution:
Steps of Construction:
1. Construct a line segment BC.
2. At the point B construct an angle ABC which is equal to 75^0.
3. Taking P and T as centres construct arcs which intersect each other at the point L.
4. Now join BL and produce it to point D.
Here BD bisects ∠ABC.



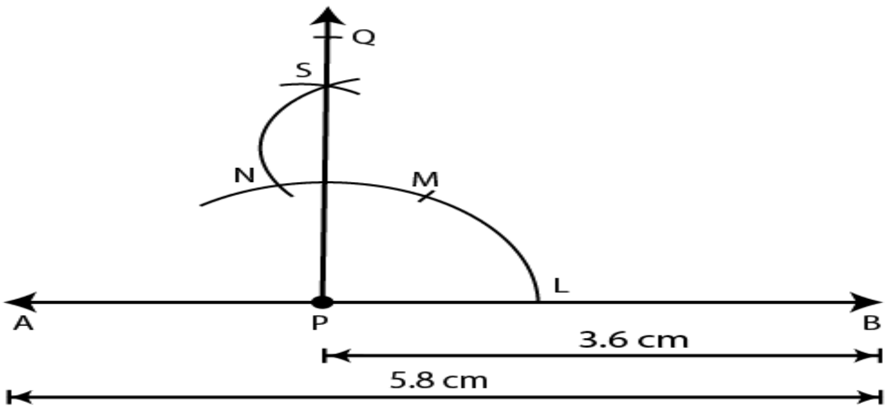
6. Draw a line segment of length 6 .4 cm. Draw its perpendicular bisector.
Solution:

Steps of Construction:
1. Construct a line segment AB = 6.4 cm.
2. Taking A and B as centres and with some suitable radius construct arcs which intersect each other at the points S and R.
3. Now join SR which intersects AB at the point Q.
Here PQR is the perpendicular bisector of the line segment AB.



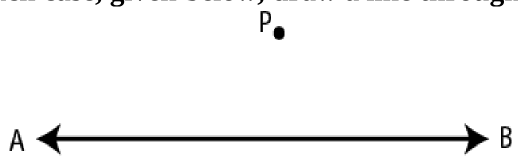
7. Draw a line segment AB = 5.8 cm. Mark a point P in AB such that PB = 3.6 cm. At P, draw perpendicular to AB.
Solution:

Steps of Construction:
1. Construct a line segment AB = 5.8 cm.
2. Now mark a point P on the line segment AB such that PB = 3.6 cm.
3. Taking P as centre and some suitable radius construct an arc which meets AB at the point L.
4. Taking L as centre and same radius cut off the arcs LM and then as N.
5. Now bisect the arc MN at the point S.
6. Join PS and produce it to point Q.
Here PQ is perpendicular to the line segment AB at point P.

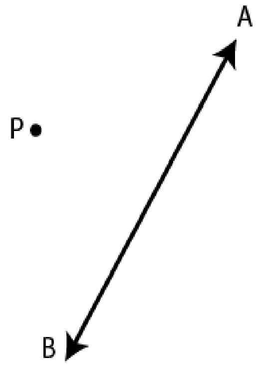


8. In each case, given below, draw a line through point P and parallel to AB:

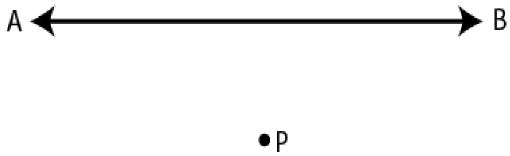
(i)



(ii)

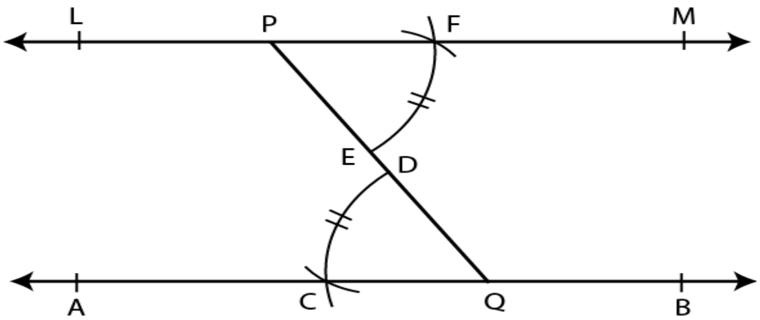


(iii)

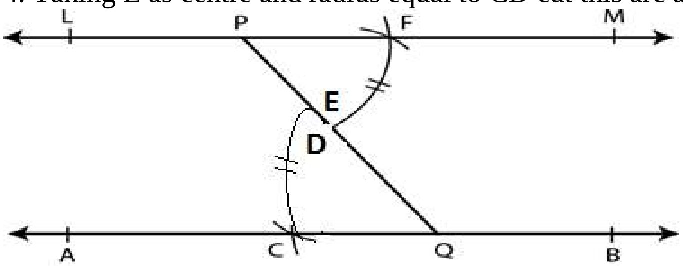


Solution:

Steps of Construction:
1. From the point P construct a line segment meeting AB
2. Taking Q as centre and some suitable radius construct an arc CD.
3. Taking P as centre and same radius construct another arc which meets PQ at the point E.



4. Taking E as centre and radius equal to CD cut this arc at the point F.



5. Now join PF and produce it to both sides to L and M.
Here the line LM is parallel to the given line AB.