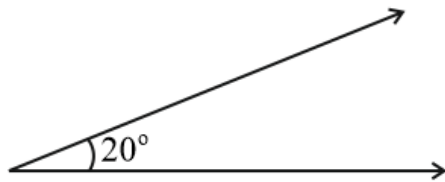


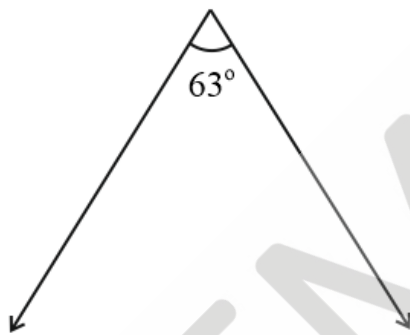
CBSE NCERT Solutions for Class 7 Mathematics Chapter 5**Back of Chapter Questions****Exercise 5.1**

1. Find the complement of the following angles:

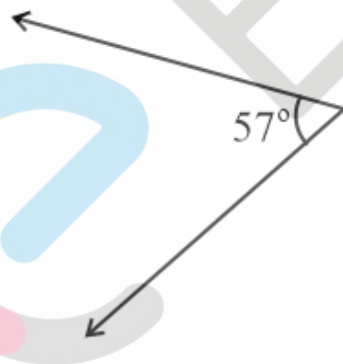
(i)



(ii)



(iii)

**Solution:**

- (i) We know that complement of an angle = $90^\circ - \text{angle}$.
Therefore, complement of $20^\circ = 90^\circ - 20^\circ$
 $= 70^\circ$

(ii) We know that complement of an angle = $90^\circ - \text{angle}$.

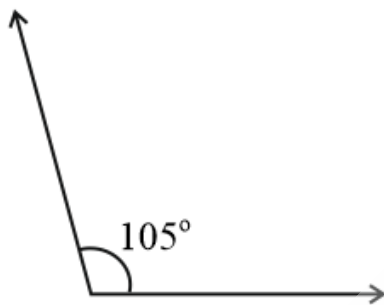
$$\begin{aligned}\text{Therefore, complement of } 63^\circ &= 90^\circ - 63^\circ \\ &= 27^\circ\end{aligned}$$

(iii) We know that complement of an angle = $90^\circ - \text{angle}$.

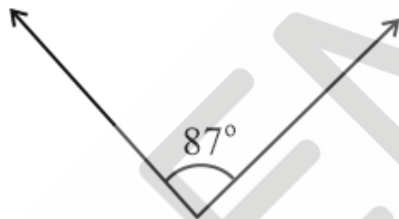
$$\begin{aligned}\text{Therefore, complement of } 57^\circ &= 90^\circ - 57^\circ \\ &= 33^\circ\end{aligned}$$

2. Find the supplement of each of the following angles:

(i)



(ii)



(iii)



Solution:

(i) We know that, Supplement of an angle = $180^\circ - \text{angle}$

$$\begin{aligned}\text{Therefore, Supplement of } 105^\circ &= 180^\circ - 105^\circ \\ &= 75^\circ\end{aligned}$$

(ii) We know that, Supplement of an angle = $180^\circ - \text{angle}$

$$\begin{aligned}\text{Therefore, Supplement of } 87^\circ &= 180^\circ - 87^\circ \\ &= 93^\circ\end{aligned}$$

- (iii) We know that, Supplement of an angle = $180^\circ - \text{angle}$
Therefore, Supplement of $154^\circ = 180^\circ - 154^\circ$
 $= 26^\circ$

3. Identify which of the following pairs of angles are complementary and which are supplementary.

- (i) $65^\circ, 115^\circ$
(ii) $63^\circ, 27^\circ$
(iii) $112^\circ, 68^\circ$
(iv) $130^\circ, 50^\circ$
(v) $45^\circ, 45^\circ$
(vi) $80^\circ, 10^\circ$

Solution:

We know that the sum of the measures of supplementary angles is 180° and that of complementary angles is 90° .

- (i) $65^\circ + 115^\circ = 180^\circ$
Therefore, given pair of angles is supplementary.
- (ii) $63^\circ + 27^\circ = 90^\circ$
Therefore, given pair of angles is complementary.
- (iii) $112^\circ + 68^\circ = 180^\circ$
Therefore, given pair of angles is supplementary.
- (iv) $130^\circ + 50^\circ = 180^\circ$
Therefore, given pair of angles is supplementary.
- (v) $45^\circ + 45^\circ = 90^\circ$
Therefore, given pair of angles is complementary.
- (vi) $80^\circ + 10^\circ = 90^\circ$
Therefore, given pair of angles is complementary.

4. Find the angle which is equal to its complement.

Solution:

Let the angle = a

It is given that its complement = a

We know that the sum of the measures of complementary angles is 90° .
Therefore,

$$a + a = 90^\circ$$

$$\Rightarrow 2a = 90^\circ$$

$$\Rightarrow a = 45^\circ$$

Therefore, 45° is the angle which is equal to its complement.

5. Find the angle which is equal to its supplement.

Solution:

Let the angle = a

It is given that its supplement = a

We know that the sum of the measures of supplementary angles is 180° .
Therefore,

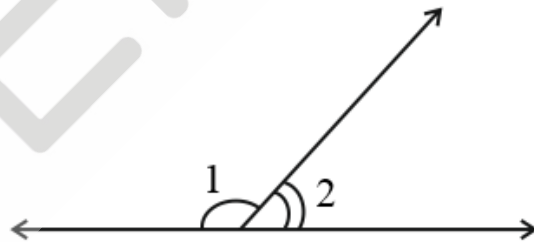
$$a + a = 180^\circ$$

$$\Rightarrow 2a = 180^\circ$$

$$\Rightarrow a = 90^\circ$$

Therefore, 90° is the angle which is equal to its supplement.

6. In the given figure, $\angle 1$ and $\angle 2$ are supplementary angles. If $\angle 1$ is decreased, what changes should take place in $\angle 2$ so that both the angles still remain supplementary.



Solution:

We know that the sum of the measures of supplementary angles is 180° .

$$\text{Therefore, } \angle 1 + \angle 2 = 180^\circ$$

$$\angle 2 = 180^\circ - \angle 1$$

So, if $\angle 1$ is decreased then $\angle 2$ will increase so that both angles still remain supplementary.

7. Can two angles be supplementary if both of them are:

- (i) acute?
- (ii) obtuse?
- (iii) right?

Solution:

We know that the sum of the measures of supplementary angles is 180° .

- (i) If both angles are acute (less than 90°), then their sum can never be 180° . Therefore, two angles cannot be supplementary if both of them are acute.
- (ii) If both angles are obtuse (greater than 90°), then their sum is always greater than 180° . Therefore, two angles cannot be supplementary if both of them are obtuse.
- (iii) If both angles are right angle (equal to 90°), then their sum is always equal to 180° . Therefore, two angles can be supplementary if both of them are right.

8. An angle is greater than 45° . Is its complementary angle greater than 45° or equal to 45° or less than 45° ?

Solution:

Let A and B are two angles making a complementary angle pair.

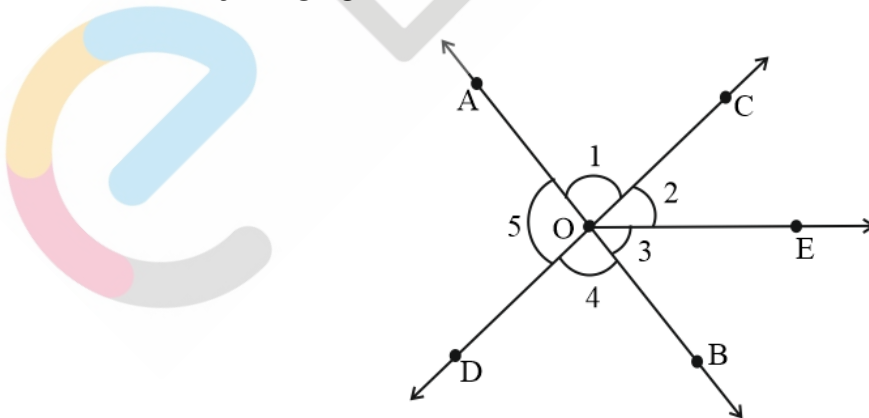
Let A is greater than 45° .

Therefore, $A + B = 90^\circ$

$$\Rightarrow B = 90^\circ - A$$

So, if A is greater than 45° , then B will be less than 45° .

9. In the adjoining figure:



- (i) Is $\angle 1$ adjacent to $\angle 2$?
- (ii) Is $\angle AOC$ adjacent to $\angle AOE$?

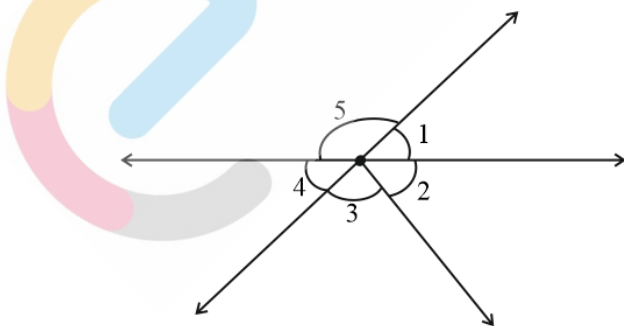
- (iii) Do $\angle COE$ and $\angle EOD$ form a linear pair?
- (iv) Are $\angle BOD$ and $\angle DOA$ supplementary?
- (v) Is $\angle 1$ vertically opposite to $\angle 4$?
- (vi) What is the vertically opposite angle of $\angle 5$?

Solution:

- (i) Yes. Since both have a common vertex O and also a common arm OC . Also, their non- common arms OA and OE are on either side of the common arm. Therefore, $\angle 1$ adjacent to $\angle 2$.
- (ii) No. They have a common vertex O and also a common arm OA . However, their non-common arms OC and OE are on the same side of the common arm. Therefore, they are not adjacent to each other.
- (iii) Yes. Since they have a common vertex O and a common arm OE . Also, their non- common arms OC and OD are opposite rays. Therefore, $\angle COE$ and $\angle EOD$ form a linear pair.
- (iv) Yes. Since $\angle BOD$ and $\angle DOA$ have a common vertex O and their non-common arms are opposite to each other. Therefore, $\angle BOD$ and $\angle DOA$ are supplementary.
- (v) Yes. Since $\angle 1$ and $\angle 4$ are formed due to the intersection of two straight lines AB and CD . Therefore, $\angle 1$ vertically opposite to $\angle 4$.
- (vi) $\angle COB$ is the vertically opposite angle of $\angle 5$ as these are formed due to the intersection of two straight lines AB and CD .

10. Indicate which pairs of angles are:

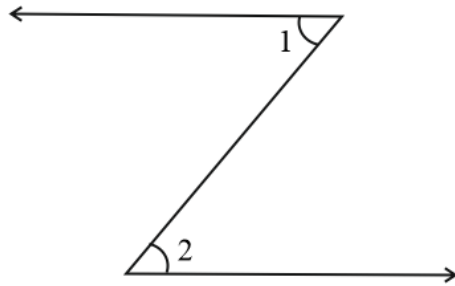
- (i) Vertically opposite angles.
- (ii) Linear pairs.

**Solution:**

- (i) $\angle 1$ and $\angle 4$, $\angle 5$ and $(\angle 2 + \angle 3)$ are vertically opposite angles as these are formed due to the intersection of two straight lines.

- (ii) $\angle 1$ and $\angle 5$, $\angle 5$ and $\angle 4$ as these have a common vertex and also have non-common arms opposite to each other.

11. In the following figure, is $\angle 1$ adjacent to $\angle 2$? Give reasons.

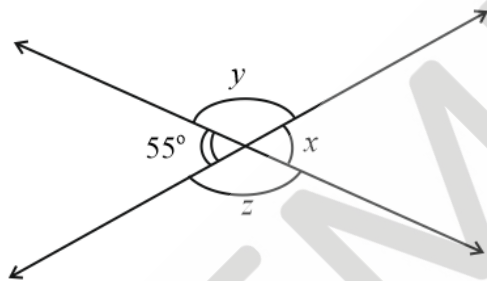


Solution:

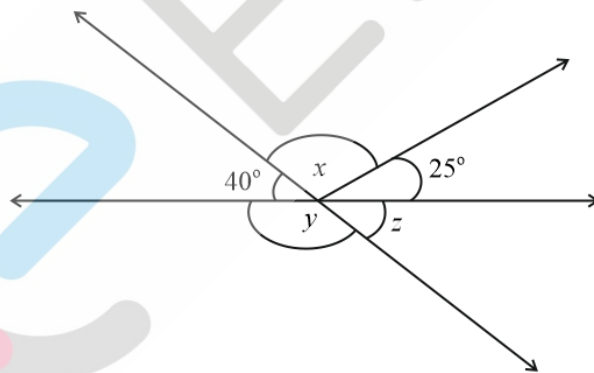
$\angle 1$ and $\angle 2$ are not adjacent angles because their vertex is not common.

12. Find the values of the angles x , y , and z in each of the following:

(i)



(ii)



Solution:

- (i) Since $\angle x$ and $\angle 55^\circ$ are vertically opposite angles.
Therefore, $\angle x = 55^\circ$
And $\angle x + \angle y = 180^\circ$ (Linear pair)

$$\Rightarrow 55^\circ + \angle y = 180^\circ$$

$$\Rightarrow \angle y = 180^\circ - 55^\circ = 125^\circ$$

Since, $\angle y = \angle z$ (Vertically opposite angles)

$$\text{Therefore, } \angle z = 125^\circ$$

Therefore, values of x, y and z are $55^\circ, 125^\circ$ and 125° respectively.

(ii) $\angle z = 40^\circ$ (Vertically opposite angles)

$$\Rightarrow \angle y + \angle z = 180^\circ \text{ (Linear pair)}$$

$$\Rightarrow \angle y = 180^\circ - 40^\circ = 140^\circ$$

$$40^\circ + \angle x + 25^\circ = 180^\circ \text{ (Angles on a straight line)}$$

$$\Rightarrow 65^\circ + \angle x = 180^\circ$$

$$\Rightarrow \angle x = 180^\circ - 65^\circ = 115^\circ$$

Therefore, values of x, y and z are $115^\circ, 140^\circ$ and 40° respectively.

13. Fill in the blanks:

(i) If two angles are complementary, then the sum of their measures is _____.

(ii) If two angles are supplementary, then the sum of their measures is _____.

(iii) Two angles forming a linear pair are _____.

(iv) If two adjacent angles are supplementary, they form a _____.

(v) If two lines intersect at a point, then the vertically opposite angles are always _____.

(vi) If two lines intersect at a point, and if one pair of vertically opposite angles are acute angles, then the other pair of vertically opposite angles are _____.

Solution:

(i) 90°

(ii) 180°

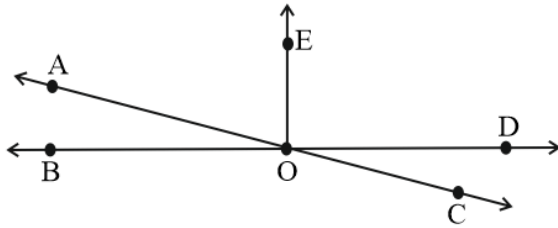
(iii) supplementary

(iv) linear pair

(v) equal

(vi) obtuse angles

14. In the adjoining figure, name the following pairs of angles.



- (i) Obtuse vertically opposite angles
- (ii) Adjacent complementary angles
- (iii) Equal supplementary angles
- (iv) Unequal supplementary angles
- (v) Adjacent angles that do not form a linear pair

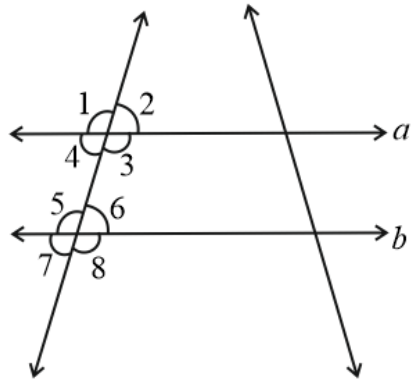
Solution:

- (i) $\angle AOD$ and $\angle BOC$
- (ii) $\angle EOA$ and $\angle AOB$
- (iii) $\angle EOB$ and $\angle EOD$
- (iv) $\angle EOA$ and $\angle EOC$, $\angle DOA$ and $\angle AOB$, $\angle AOD$ and $\angle DOC$, $\angle COB$ and $\angle AOB$, $\angle BOC$ and $\angle COD$
- (v) $\angle AOB$ and $\angle AOE$, $\angle AOE$ and $\angle EOD$, $\angle EOD$ and $\angle COD$

Exercise 5.2

1. State the property that is used in each of the following statements?

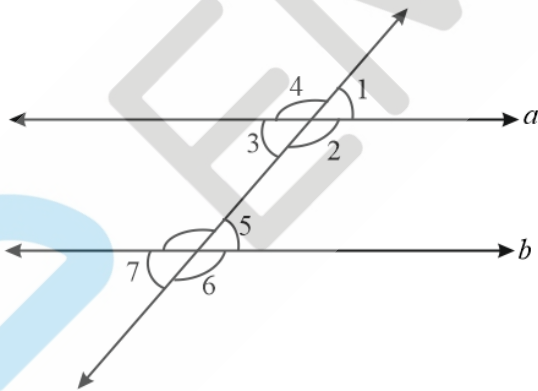
- (i) If $a \parallel b$, then $\angle 1 = \angle 5$.
- (ii) If $\angle 4 = \angle 6$, then $a \parallel b$.
- (iii) If $\angle 4 + \angle 5 = 180^\circ$, then $a \parallel b$.

**Solution:**

- (i) Corresponding angles property.
- (ii) Alternate interior angles property.
- (iii) Interior angles on the same side of the transversal are supplementary.

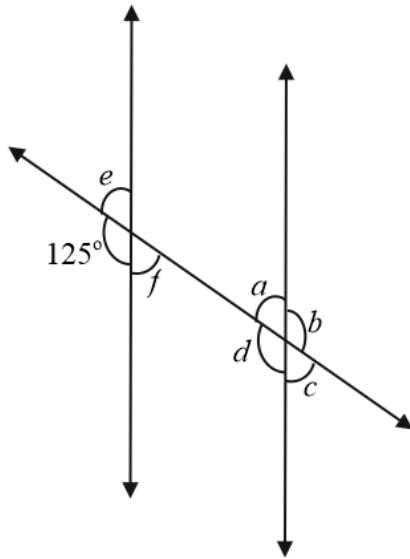
2. In the adjoining figure, identify

- (i) the pairs of corresponding angles.
- (ii) the pairs of alternate interior angles.
- (iii) the pairs of interior angles on the same side of the transversal.
- (iv) the vertically opposite angles.

**Solution:**

- (i) $\angle 1$ and $\angle 5$, $\angle 2$ and $\angle 6$, $\angle 3$ and $\angle 7$, $\angle 4$ and $\angle 8$
- (ii) $\angle 2$ and $\angle 8$, $\angle 3$ and $\angle 5$
- (iii) $\angle 2$ and $\angle 5$, $\angle 3$ and $\angle 8$
- (iv) $\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$, $\angle 5$ and $\angle 7$, $\angle 6$ and $\angle 8$

3. In the adjoining figure, $p \parallel q$. Find the unknown angles.

**Solution:**

$$\angle d = 125^\circ \text{ (Pair of corresponding angles)}$$

$$\angle e = 180^\circ - 125^\circ = 55^\circ \text{ (Linear pair)}$$

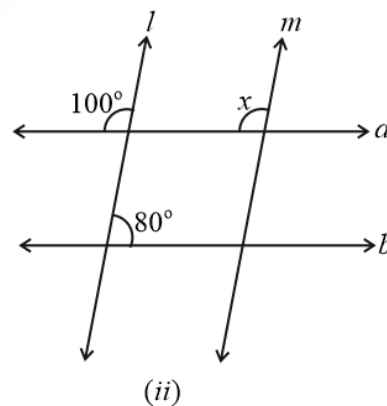
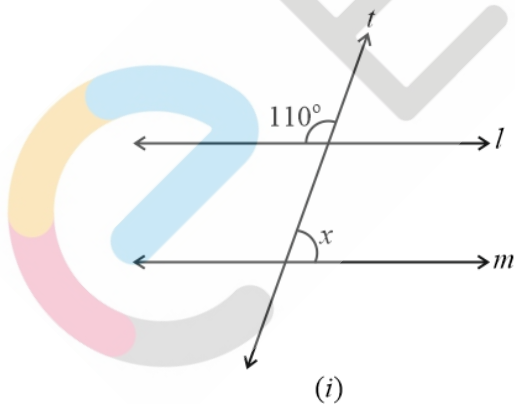
$$\angle f = \angle e = 55^\circ \text{ (Vertically opposite angles)}$$

$$\angle c = \angle f = 55^\circ \text{ (Pair of corresponding angles)}$$

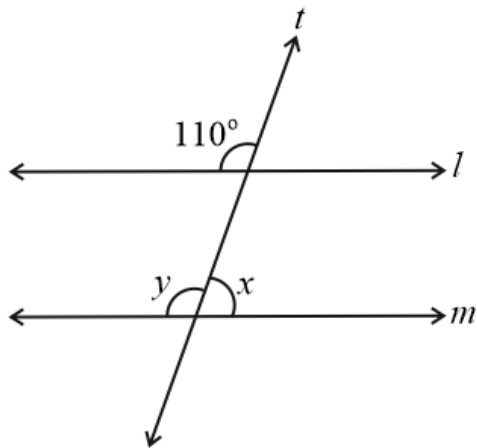
$$\angle a = \angle e = 55^\circ \text{ (Pair of corresponding angles)}$$

$$\angle b = \angle d = 125^\circ \text{ (Vertically opposite angles)}$$

4. Find the value of x in each of the following figures if $l \parallel m$.

**Solution:**

(i)



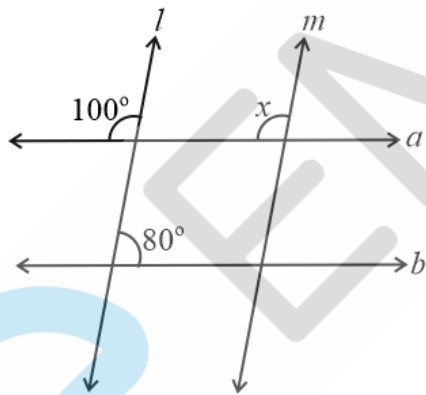
$$\angle y = 110^\circ \text{ (Pair of corresponding angles)}$$

$$\angle y + \angle x = 180^\circ \text{ (Linear Pair)}$$

$$\Rightarrow 110^\circ + \angle x = 180^\circ$$

$$\Rightarrow \angle x = 180^\circ - 110^\circ = 70^\circ$$

(ii)

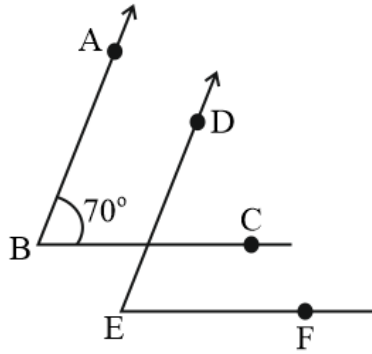


$$\angle x = 100^\circ \text{ (Pair of corresponding angle)}$$

5. In the given figure, the arms of two angles are parallel. If $\angle ABC = 70^\circ$, then find

(i) $\angle DGC$

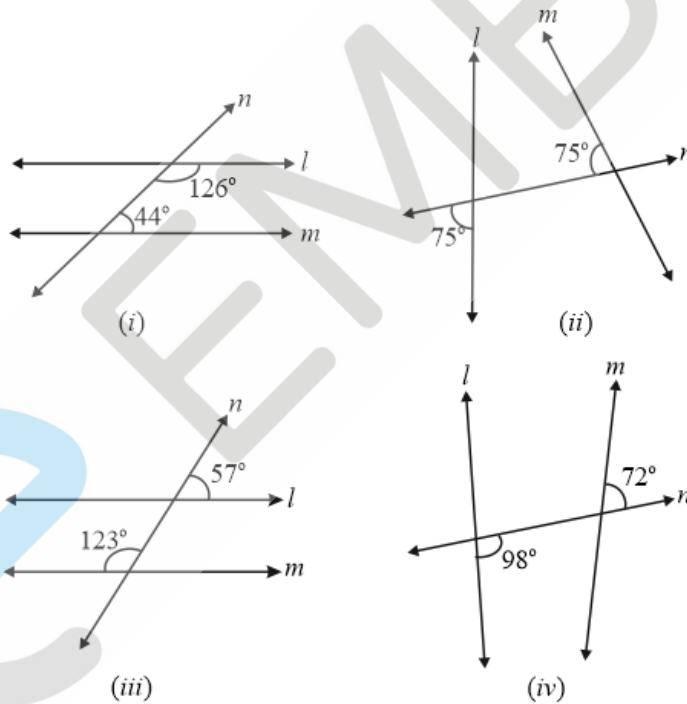
(ii) $\angle DEF$



Solution:

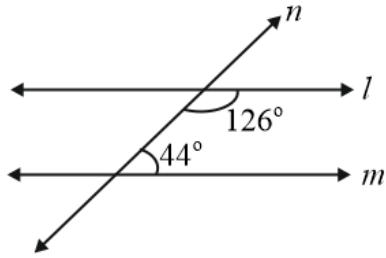
- (i) Given, $AB \parallel DE$ and a transversal line BC is intersecting them.
Therefore, $\angle DGC = \angle ABC = 70^\circ$ (Pair of corresponding angles)
- (ii) Consider $BC \parallel EF$ and a transversal line DE is intersecting them.
Therefore, $\angle DEF = \angle DGC = 70^\circ$ (Pair of corresponding angles)

6. In the given figures below, decide whether l is parallel to m .



Solution:

- (i)



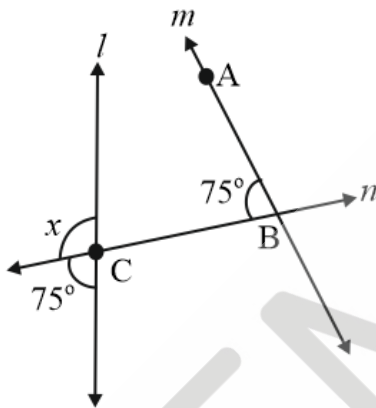
Since, n is the transversal line of two lines l and m .

Sum of interior angles on the same side of transversal = $126^\circ + 44^\circ = 170^\circ$.

As the sum of interior angle on the same side of transversal $\neq 180^\circ$.

Therefore, l is not parallel to m .

(ii)



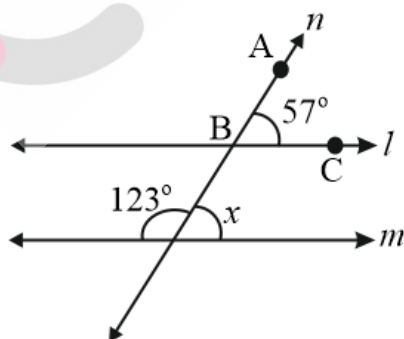
$$x + 75^\circ = 180^\circ \text{ (Linear Pair)}$$

$$\Rightarrow x = 180^\circ - 75^\circ = 105^\circ$$

For the lines l and m to be parallel to each other, their corresponding angles $\angle ABC$ and x should be equal.

But they are not equal. So, l is not parallel to m .

(iii)

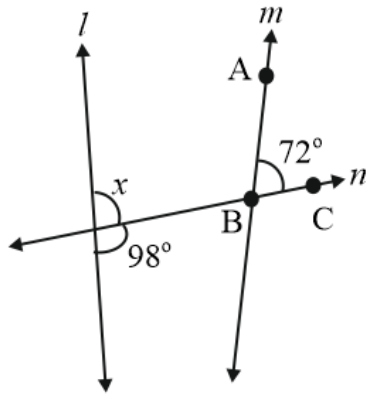


$$x + 123^\circ = 180^\circ \text{ (Linear Pair)}$$

$$\Rightarrow x = 180^\circ - 123^\circ = 57^\circ$$

For the lines l and m to be parallel to each other, their corresponding angles $\angle ABC$ and x should be equal. Since, they are equal. Therefore, l is parallel to m .

(iv)



$$x + 98^\circ = 180^\circ \text{ (Linear Pair)}$$

$$\Rightarrow x = 180^\circ - 98^\circ = 82^\circ$$

For the lines l and m to be parallel to each other, their corresponding angles $\angle ABC$ and x should be equal.

But actually they are not equal. So, l is not parallel to m .

◆◆◆