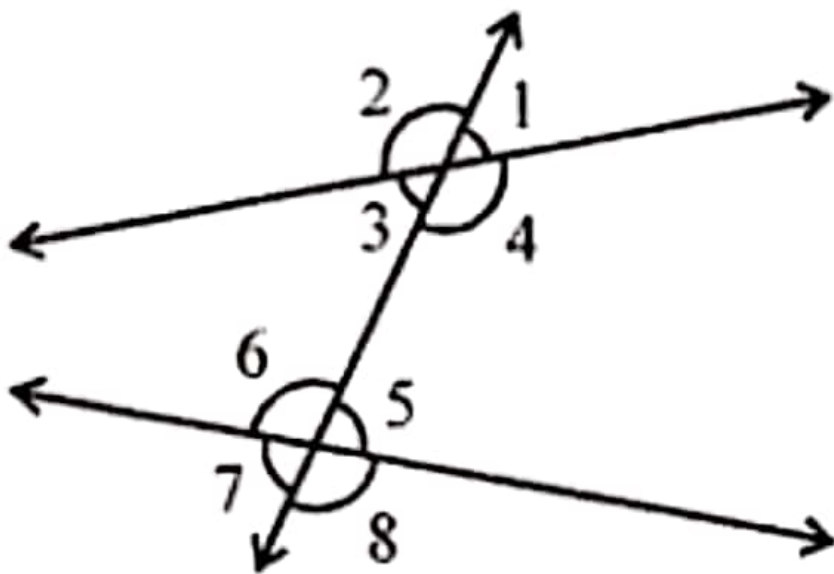


Question 1.

Identity each of the given pair of angles as alternate interior angles, co-interior angles or corresponding angles or none of these in the given figure:



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

Solution:

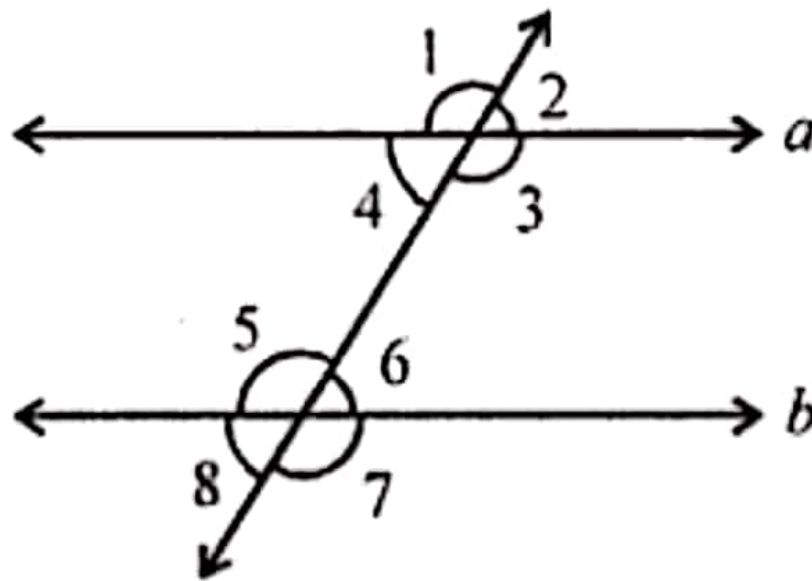
In the given figure,

- (i) $\angle 2$ and $\angle 6$ – are corresponding angles.
- (ii) $\angle 1$ and $\angle 6$ – none
- (iii) $\angle 3$ and $\angle 5$ – alternate interior angles
- (iv) $\angle 2$ and $\angle 7$ – none
- (v) $\angle 3$ and $\angle 6$ – co-interior angles
- (vi) $\angle 4$ and $\angle 8$ – corresponding angles

Question 2.

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:

In the given figure,

- (i) If $a \parallel b$, then

$\angle 1 = \angle 5$ (Property of the corresponding pair of angles)

- (ii) If $\angle 4 = \angle 6$

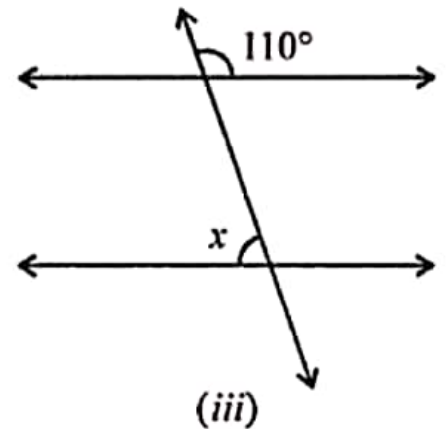
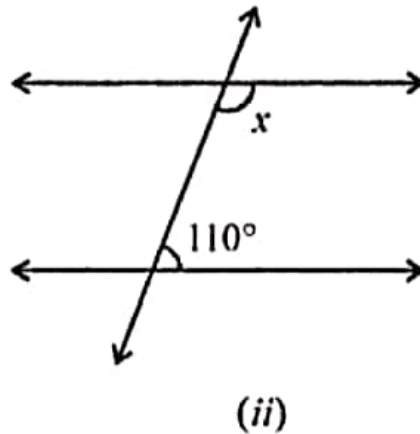
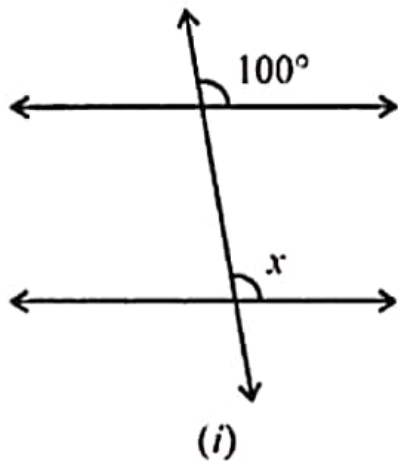
Property of interior alternate angles are equal
 $a \parallel b$

- (iii) If $\angle 4 + \angle 5 = 180^\circ$

Property of co-interior angles are supplementary.

Question 3.

In each of the following figures, a pair of parallel lines is cut by a transversal. Find the value of x :



Solution:

(i) In the given figure,

$x = 100$ (Corresponding angles)

(ii) $x + 110^\circ = 180^\circ$

(Cointerior Angles are Supplementary)

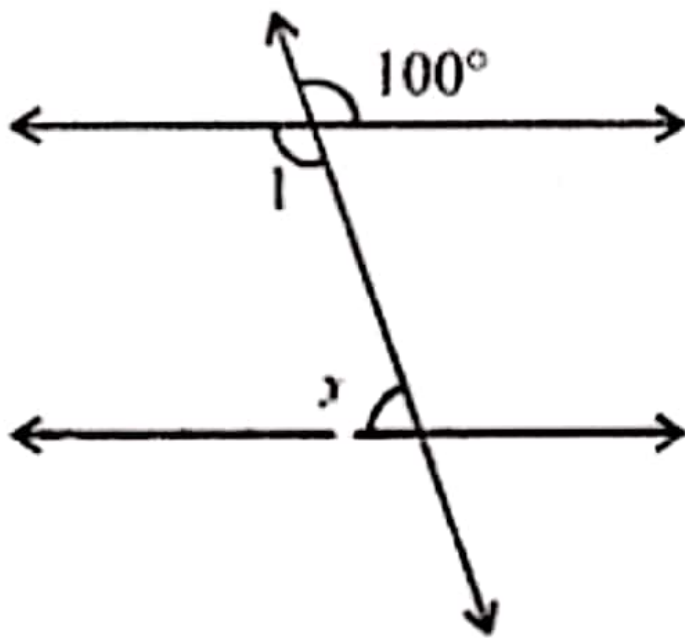
$x = 180^\circ - 110^\circ = 70^\circ$

(iii) Let $\angle 1$ opposite to $\angle 110^\circ$

$\angle 1 = 110^\circ$ (Vertically opposite angles)

and $\angle 1 + x = 180^\circ$

(Cointerior Angles are Supplementary)



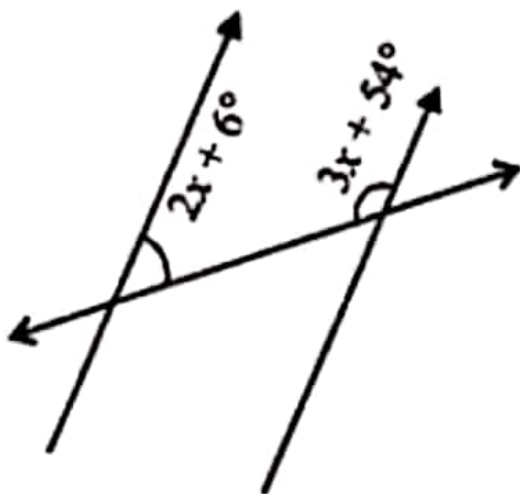
$$\Rightarrow 110^\circ + x = 180^\circ$$

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

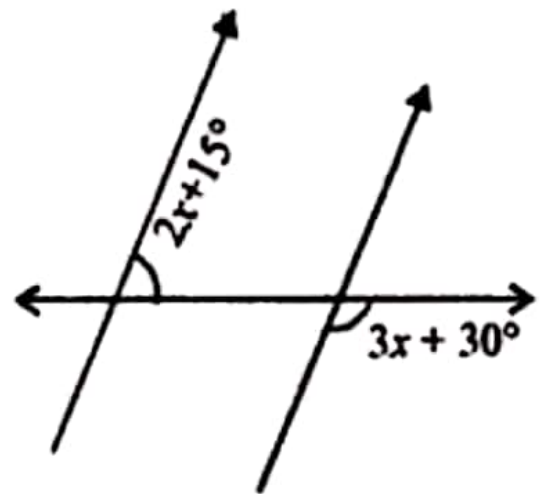
$$\Rightarrow x = 70^\circ$$

Question 4.

In the following figures, a pair of parallel lines are cut by a transversal. Find the value of x in each figure.



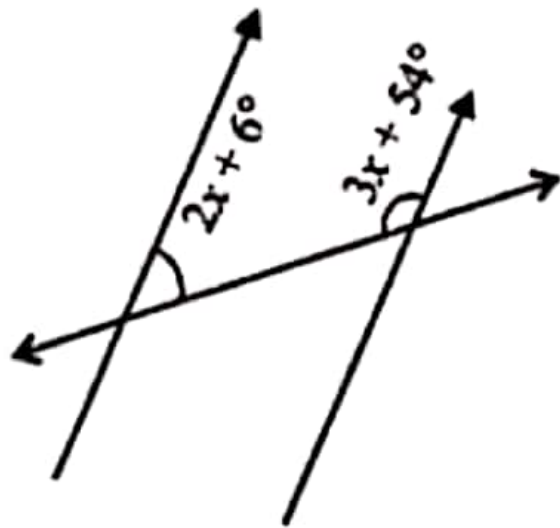
(i)



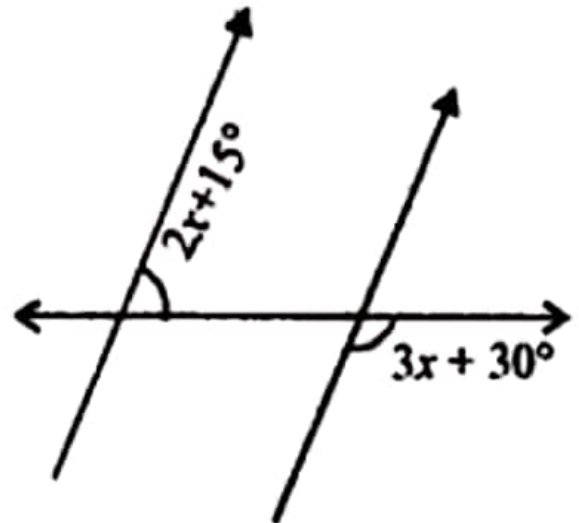
(ii)

Question 4.

In the following figures, a pair of parallel lines are cut by a transversal. Find the value of x in each figure.



(i)



(ii)

Solution:

(i) $AB \parallel CD$ and EF its transversal

$$\Rightarrow \angle AGH + \angle GHC = 180^\circ$$

$$\Rightarrow 2x + 60 + 3x + 54^\circ = 180^\circ$$

(Sum of co-interior angles)

$$\Rightarrow 5x + 60^\circ = 180^\circ$$

$$\Rightarrow 5x = 180^\circ - 60^\circ = 120^\circ$$

$$\Rightarrow x = 24^\circ$$

$$x = 24^\circ$$

(ii) $AB \parallel CD$ and EF is its transversal

Which intersects them at G and H .

$\angle HGB = \angle FHD$ (Corresponding angles)

$$\angle HGB = 3x + 30^\circ$$

But $\angle AGH + \angle HGB = 180^\circ$ (Linear pair)

$$2x + 15^\circ + 3x + 30^\circ = 180^\circ$$

$$\Rightarrow 5x + 45^\circ = 180^\circ$$

$$\Rightarrow 5x = 180^\circ - 45^\circ = 135^\circ$$

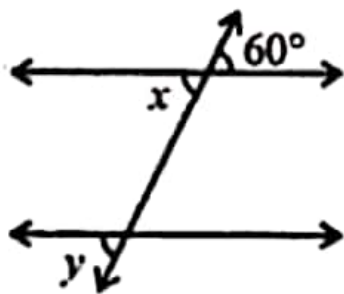
$$\Rightarrow 5x = 135^\circ$$

$$\Rightarrow x = 27^\circ$$

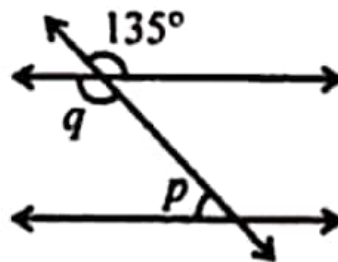
$$x = 27^\circ$$

Question 5.

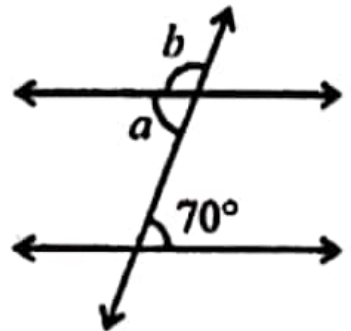
In the following figures (i) to (vi), a pair of parallel lines are cut by a transversal. Find the size of each lettered angle.



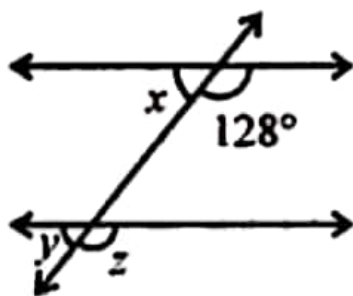
(i)



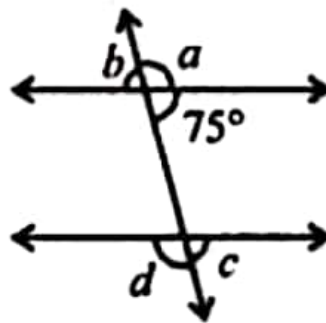
(ii)



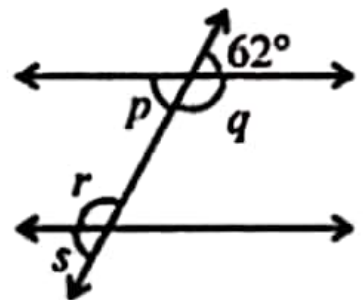
(iii)



(iv)



(v)



(vi)

Solution:

In the given figure,

(i) Given angle is 60°

$x = 60^\circ$ (Vertically opposite angles)

But $\angle y = \angle x$ (corresponding angles)

$\angle y = 60^\circ$

Hence, $\angle x = 60^\circ$, $\angle y = 60^\circ$

(ii) In the given figure,

Given angle is 135°

$\angle q = 135^\circ$ (Vertically opposite angles)

But $\angle p + \angle q = 180^\circ$ (Sum of cointerior angles)

$$135^\circ + \angle q = 180^\circ$$

$$\angle q = 180^\circ - 135^\circ = 45^\circ$$

$$\angle p = 45^\circ, \angle q = 135^\circ$$

(iii) In the given figure,

Given angle is 70°

$a = 70^\circ$ (Alternate angles)

But $\angle a + \angle b = 180^\circ$ (Linear pair)

$$70^\circ + \angle b = 180^\circ$$

$$\angle b = 180^\circ - 70^\circ = 110^\circ$$

$$\angle a = 70^\circ, \angle b = 110^\circ$$

(iv) In the given figure,

Given angle is 128°

$\angle x + 128^\circ = 180^\circ$ (Linear pair)

$$\angle x = 180^\circ - 128^\circ = 52^\circ$$

But $\angle x = \angle y$ (Corresponding angles)

$$\angle y = 52^\circ$$

Also, $y + z = 180^\circ$ (Linear pair)

$$52^\circ + \angle z = 180^\circ$$

$$\angle z = 180^\circ - 52^\circ$$

$$\angle z = 128^\circ$$

Hence, $x = 52^\circ, y = 52^\circ, z = 128^\circ$

(v) In the given figure,

Given angle is 75°

$$\angle a + 75^\circ = 180^\circ \text{ (Linear pair)}$$

$$\angle a = 180^\circ - 75^\circ = 105^\circ$$

$$\angle b = 75^\circ \text{ (Vertically opposite angles)}$$

$$\angle c = 75^\circ \text{ (Corresponding angles)}$$

$$\text{But } \angle c + \angle d = 180^\circ \text{ (Linear pair)}$$

$$75^\circ + \angle d = 180^\circ$$

$$\angle d = 180^\circ - 75^\circ = 105^\circ$$

$$\angle a = 105^\circ, \angle b = 75^\circ, \angle c = 75^\circ, \angle d = 105^\circ$$

(vi) Given angle = 62°

$$62^\circ + \angle q = 180^\circ \text{ (Linear pair } \angle s)$$

$$\angle q = 180^\circ - 62^\circ = 118^\circ$$

$$\angle p = 62^\circ \text{ (Vertically opposite } \angle s)$$

$$\angle s = p \text{ (Corresponding } \angle s)$$

$$\angle s = 62^\circ$$

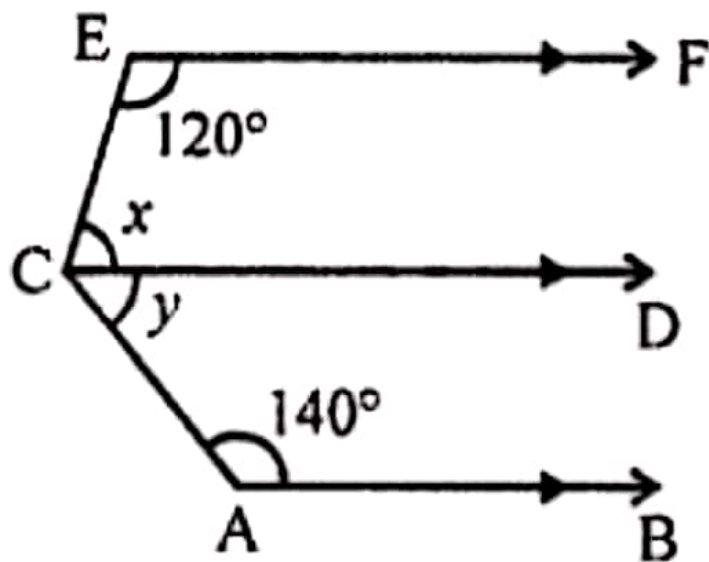
$$\angle s + \angle r = 180^\circ \text{ (Linear pair } \angle s)$$

$$62^\circ + \angle r = 180^\circ$$

$$\angle r = 180^\circ - 62^\circ = 118^\circ$$

Question 6.

In the given diagram, lines AB, CD and EF are parallel. Calculate the values of x and y . Hence, find the reflex angle ECA.



Solution:

In the given figure,

$AB \parallel CD \parallel EF$

$$\angle E = 120^\circ, \angle A = 140^\circ$$

$$y + 140^\circ = 180^\circ \text{ (Sum of co-interior angles)}$$

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

$$\text{Similarly, } x + 120^\circ = 180^\circ$$

$$x = 180^\circ - 120^\circ = 60^\circ$$

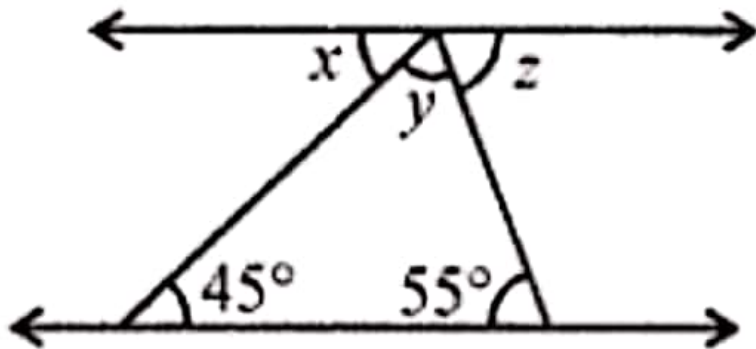
$$x = 60^\circ, y = 40^\circ$$

$$\text{Now, } \angle ECA = x + y = 60^\circ + 40^\circ = 100^\circ$$

$$\text{and reflex } \angle ECA = 360^\circ - 100^\circ = 260^\circ$$

Question 7.

In the given figure, $l \parallel m$. Find the values of x , y and z .



Solution:

In the given figure, $x = 45^\circ$ (Alternate angles)

Similarly, $z = 55^\circ$ (Alternate angles)

But $x + y + z = 180^\circ$

(Angles on the one side of a straight line)

$$\Rightarrow 45^\circ + y + 55^\circ = 180^\circ$$

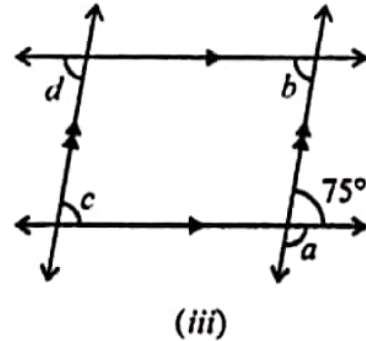
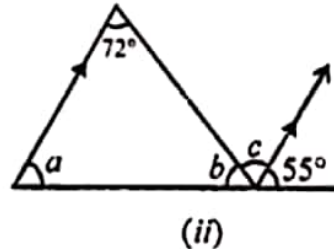
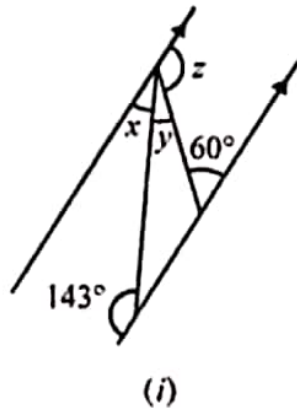
$$\Rightarrow y + 100^\circ = 180^\circ$$

$$\Rightarrow y = 180^\circ - 100^\circ = 80^\circ$$

$$x = 45^\circ, y = 80^\circ, z = 55^\circ$$

Question 8.

Calculate the measure of each lettered angle in the following figure (parallel lines, segment or rays are denoted by thick matching arrows):



Solution:

(i) In the given figure,

$$\angle x + 143^\circ = 180^\circ$$

(Sum of co-interior angles)

$$\angle x = 180^\circ - 143^\circ = 37^\circ$$

$$\text{Similarly, } \angle z + 60^\circ = 180^\circ$$

$$\angle y = 180^\circ - 60^\circ = 120^\circ$$

$$\text{But } \angle x + \angle y + \angle z = 180^\circ$$

(Angles on one side of a straight line)

$$37^\circ + 120^\circ + \angle y = 180^\circ$$

$$157^\circ + \angle y = 180^\circ$$

$$\angle y = 180^\circ - 157^\circ = 23^\circ$$

$$\angle x = 37^\circ, \angle y = 23^\circ, \angle z = 120^\circ$$

(ii) In the given figure,

$$\angle c = 72^\circ \text{ (Alternate angles)}$$

$$\angle a = 55^\circ \text{ (Corresponding angles)}$$

$$\text{But } \angle b + \angle c + 55^\circ = 180^\circ$$

(Angles on one side of a straight line)

$$\angle b + 72^\circ + 55^\circ = 180^\circ$$

$$\angle b + 127^\circ = 180^\circ$$

$$\angle b = 180^\circ - 127^\circ = 53^\circ$$

$$\text{Here, } \angle a = 55^\circ, \angle b = 53^\circ, \angle c = 72^\circ$$

(iii) In the given figure,

$$\angle a + 75^\circ = 180^\circ \text{ (Linear pair)}$$

$$\angle a = 180^\circ - 75^\circ = 105^\circ$$

$$\angle b = 75^\circ \text{ (Alternate angles)}$$

$$\angle d = b \text{ (Corresponding angles)}$$

$$\angle d = 75^\circ$$

$$75^\circ = \angle c \text{ (Corresponding angles)}$$

$$\angle c = 75^\circ$$

$$\angle a = 105^\circ, \angle b = 15^\circ, \angle c = 75^\circ, \angle d = 75^\circ$$