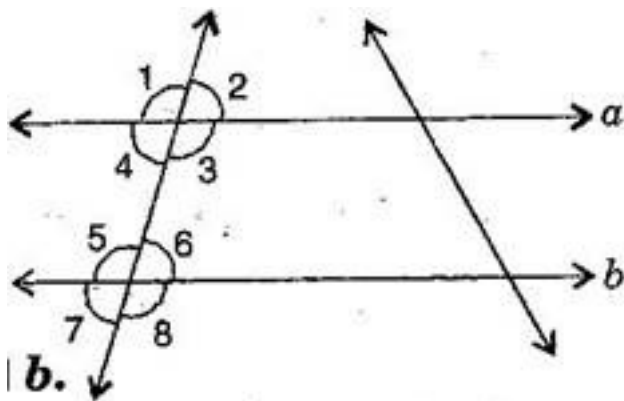


**CBSE Class –VII Mathematics**  
**NCERT Solutions**  
**Chapter 5 Lines and Angles (Ex. 5.2)**

**Question 1.** State the property that is used in each of the following statements:



1. If  $a \parallel b$ , then  $\angle 1 = \angle 5$ .
2. If  $\angle 4 = \angle 6$ , then  $a \parallel b$ .
3. If  $\angle 4 + \angle 5 = 180^\circ$ , then  $a \parallel b$ .

**Answer:** (i) Given,  $a \parallel b$  then  $\angle 1 = \angle 5$  [Corresponding angles]

If two parallel lines are cut by a transversal, each pair of corresponding angles are equal in measure.

(ii) Given,  $\angle 4 = \angle 6$ , then  $a \parallel b$  [Alternate interior angles]

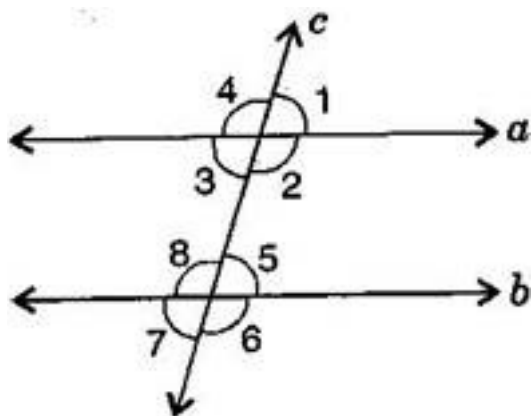
When a transversal cuts two lines such that pairs of alternate interior angles are equal, the lines have to be parallel.

(iii) Given,  $\angle 4 + \angle 5 = 180^\circ$ , then  $a \parallel b$  [Co-interior]

When a transversal cuts two lines, such that pairs of interior angles on the same side of transversal are supplementary, the lines have to be parallel.

**Question 2.** In the adjoining figure, identify:





1. the pairs of corresponding angles.
2. the pairs of alternate interior angles.
3. the pairs of interior angles on the same side of the transversal.
4. the vertically opposite angles.

**Answer:** (i) The pairs of corresponding angles:

$\angle 1, \angle 5; \angle 2, \angle 6; \angle 4, \angle 8$  and  $\angle 3, \angle 7$

(ii) The pairs of alternate interior angles are:

$\angle 3, \angle 5$  and  $\angle 2, \angle 8$

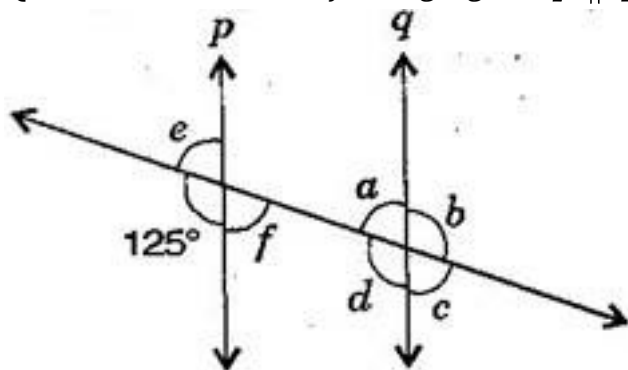
(iii) The pair of interior angles on the same side of the transversal:

$\angle 3, \angle 8$  and  $\angle 2, \angle 5$

(iv) The vertically opposite angles are:

$\angle 1, \angle 3; \angle 2, \angle 4; \angle 6, \angle 8$  and  $\angle 5, \angle 7$

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





**Answer:** Given,  $p \parallel q$  and cut by a transversal line.

$$\therefore 125^\circ + e = 180^\circ \text{ [Linear pair]}$$

$$\therefore e = 180^\circ - 125^\circ = 55^\circ \text{ .....(i)}$$

$$\text{Now } e = f = 55^\circ \text{ [Vertically opposite angles]}$$

$$\text{Also } a = f = 55^\circ \text{ [Alternate interior angles]}$$

$$a + b = 180^\circ \text{ [Linear pair]}$$

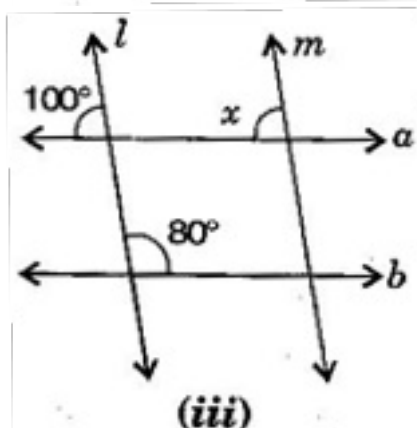
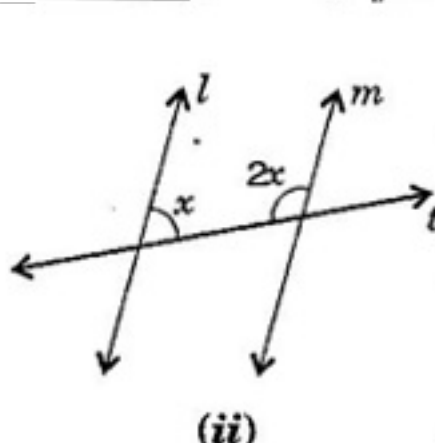
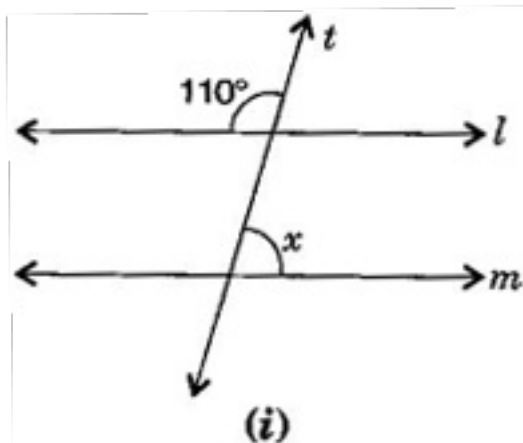
$$\Rightarrow 55^\circ + b = 180^\circ \text{ [From eq. (i)]}$$

$$\Rightarrow b = 180^\circ - 55^\circ = 125^\circ$$

$$\text{Now } a = c = 55^\circ \text{ and } b = d = 125^\circ \text{ [Vertically opposite angles]}$$

$$\text{Thus, } a = 55^\circ, b = 125^\circ, c = 55^\circ, d = 125^\circ, e = 55^\circ \text{ and } f = 55^\circ.$$

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





**Answer:** (i) Given,  $l \parallel m$  and  $t$  is transversal line.

$\therefore$  Interior vertically opposite angle between lines  $l$  and  $t = 110^\circ$ .

$\therefore 110^\circ + x = 180^\circ$  [Supplementary angles]

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

(ii) Given,  $l \parallel m$  and  $t$  is transversal line.

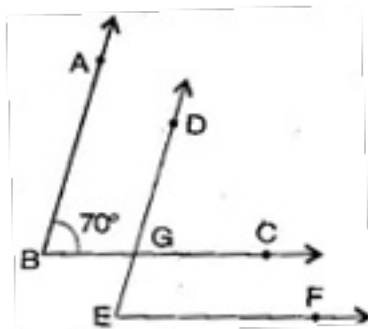
$x + 2x = 180$  [Interior opposite angles]

$$\Rightarrow 3x = 180^\circ \Rightarrow x = \frac{180^\circ}{3} = 60^\circ$$

(iii) Given,  $l \parallel m$  and  $a \parallel b$ .

$x = 100^\circ$  [Corresponding angles]

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



(i)  $\angle DGC$

(ii)  $\angle DEF$

**Answer:** (i) Given,  $AB \parallel DE$  and  $BC$  is a transversal line and  $\angle ABC = 70^\circ$

$\therefore \angle ABC = \angle DGC$  [Corresponding angles]

$\therefore \angle DGC = 70^\circ$  .....(i)

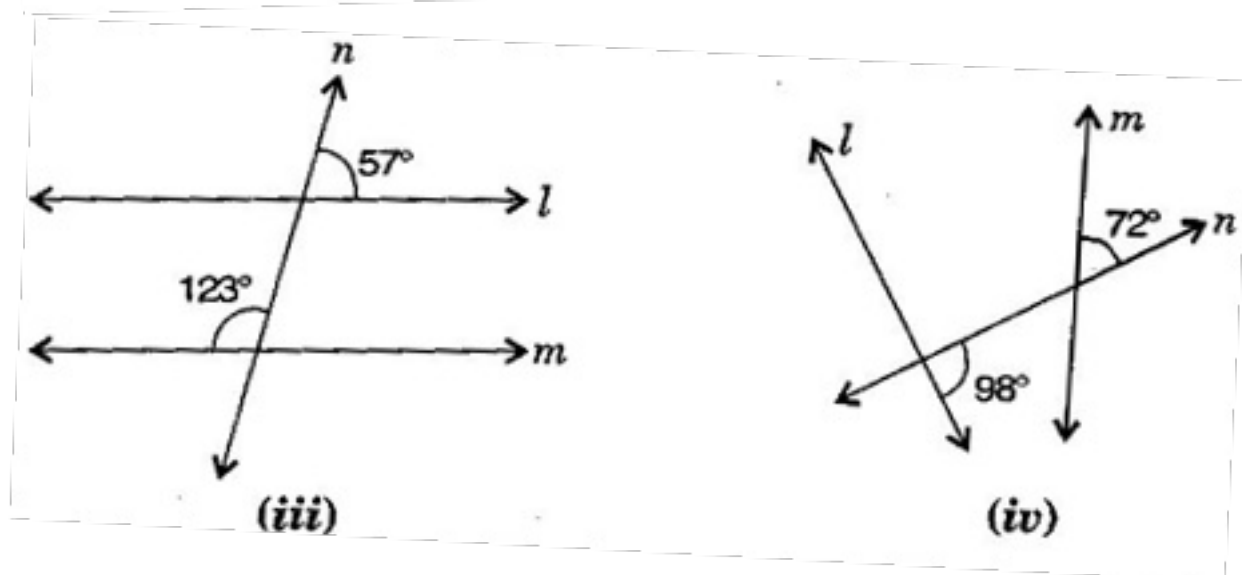
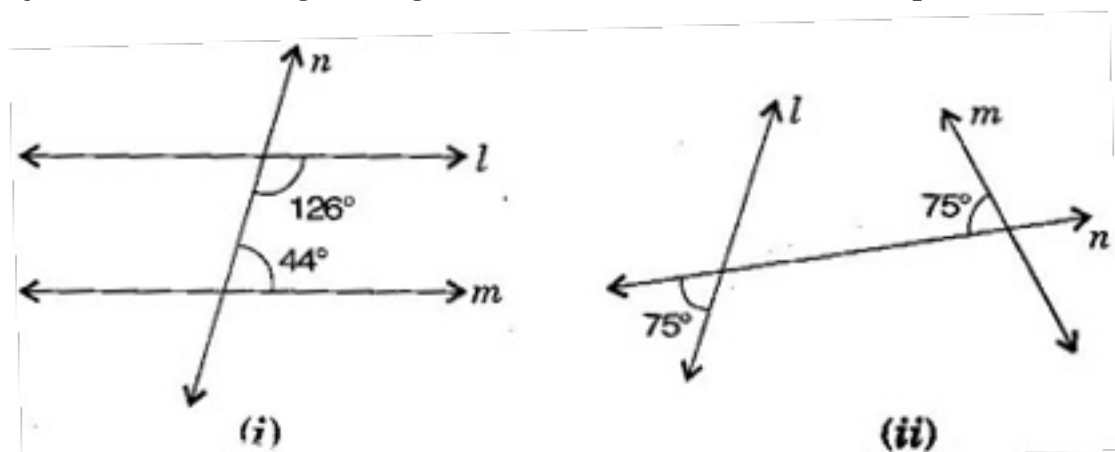
(ii) Given,  $BC \parallel EF$  and  $DE$  is a transversal line and  $\angle DGC = 70^\circ$

$\therefore \angle DGC = \angle DEF$  [Corresponding angles]

$\therefore \angle DEF = 70^\circ$  [From eq. (i)]



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



**Answer:** (i)  $126^\circ + 44^\circ = 170^\circ$

$l$  is not parallel to  $m$  because sum of interior opposite angles should be  $180^\circ$ .

(ii)  $75^\circ + 75^\circ = 150^\circ$

$l$  is not parallel to  $m$  because sum of angles does not obey the property of parallel lines.

(iii)  $57^\circ + 123^\circ = 180^\circ$

$l$  is parallel to  $m$  due to supplementary angles property of parallel lines.

(iv)  $98^\circ + 72^\circ = 170^\circ$

$l$  is not parallel to  $m$  because sum of angles does not obey the property of parallel lines.