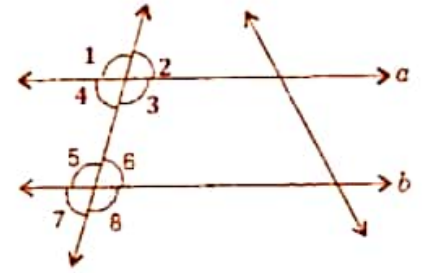


Exercise 5.2

Question 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 $a \parallel b$.



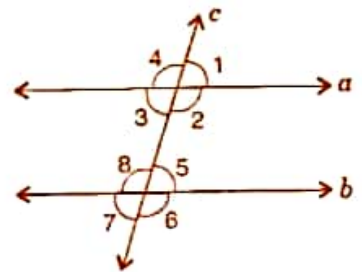
Answer 1:

- (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 Angles]
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:

- (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.



Answer 2:

- (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 3:

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

$$\therefore 125^\circ + e = 180^\circ$$

$$\therefore e = 180^\circ - 125^\circ = 55^\circ$$

Now $e = f = 55^\circ$

Also $a = f = 55^\circ$

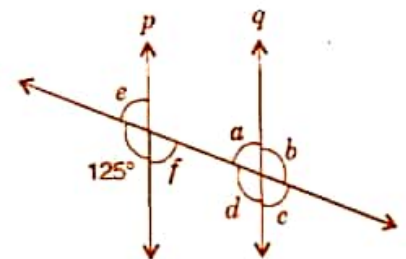
$$a + b = 180^\circ$$

$$\Rightarrow 55^\circ + b = 180^\circ$$

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

Now $a = c = 55^\circ$ and $b = d = 125^\circ$

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



[Linear pair]

..... (i)

[Vertically opposite angles]

[Alternate interior angles]

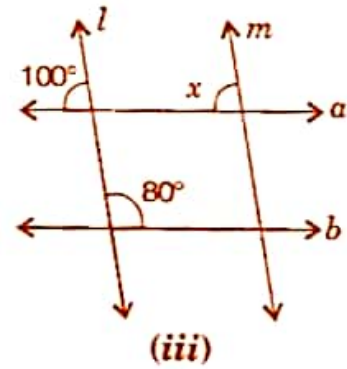
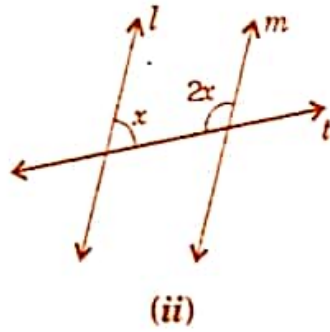
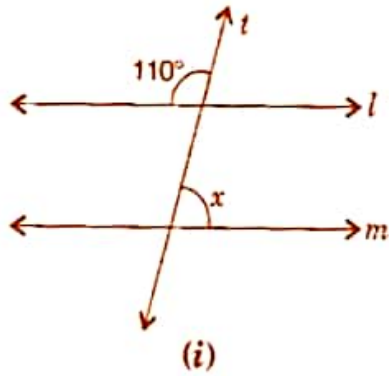
[Linear pair]

[From equation (i)]

[Vertically opposite angles]

Question 4:

Find the values of x in each of the following figures if $l \parallel m$



Answer 4:

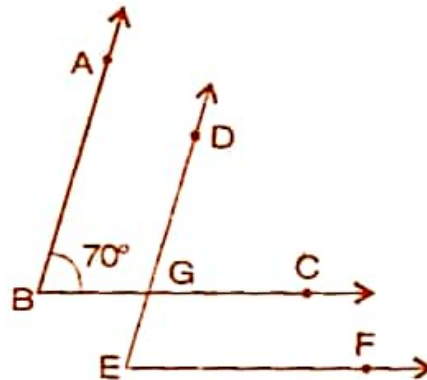
- (i) Given, $l \parallel m$ and t is transversal line.
 \therefore Interior vertically opposite angle between lines l and $t = 110^\circ$.
 $\therefore 110^\circ + x = 180^\circ$ [Supplementary angles]
 $\Rightarrow x = 180^\circ - 110^\circ = 70^\circ$
- (ii) Given, $l \parallel m$ and t is transversal 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) $\angle DEF$

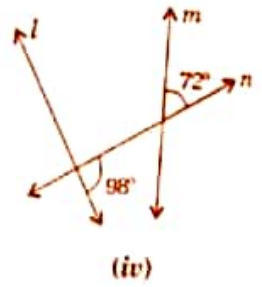
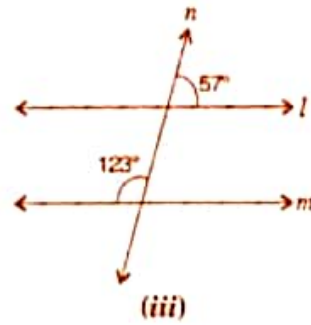
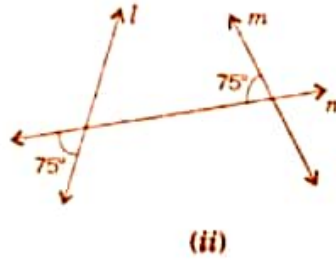
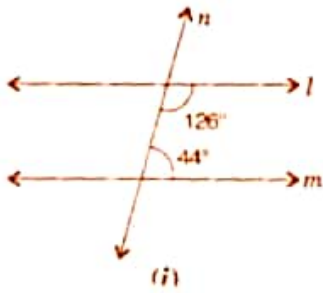


Answer 5:

- (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 equation (i)]

Question 6:

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



Answer 6:

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

l is not parallel to m because sum of co-interior angles should be 180° .

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

$l \parallel m$ 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.