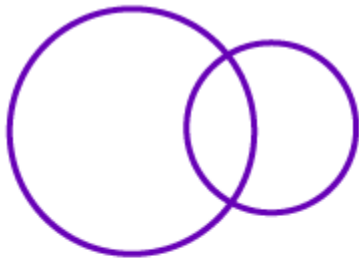


## EXERCISE 16

1. Draw the line or lines of symmetry, if any, of the following shapes and count their number:



(i)



(ii)



(iii)



(iv)



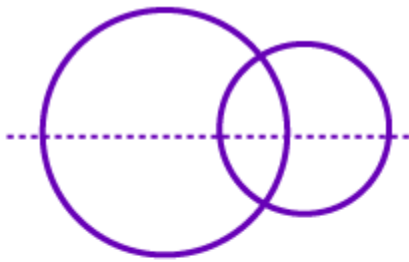
(v)



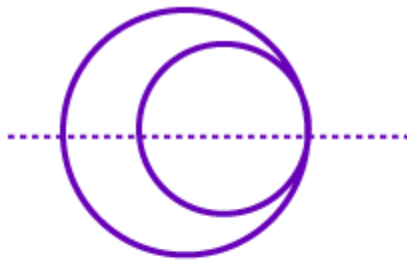
(vi)

Solution:





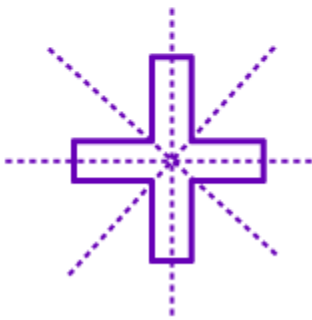
**(i)(one)**



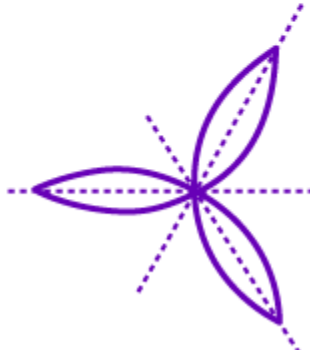
**(ii)(one)**



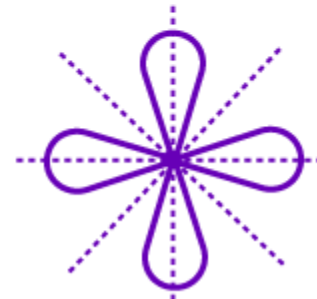
**(iii)(none)**



**(iv)(four)**



**(v)(three)**



**(vi)(four)**

**2. For each of the given shape in question 1, find the order of the rotational symmetry (if any).**

**Solution:**

- (i)** None
- (ii)** None
- (iii)** Two
- (iv)** Four
- (v)** Three
- (vi)** Four

**3. Construct a rectangle ABCD such that  $AB = 4.5$  cm and  $BC = 3$  cm. Draw its line (or lines) of symmetry.**

**Solution:**

Steps to construct:

Step 1: Draw a line segment  $AB = 4.5$  cm.

Step 2: Draw a line BQ from point B making an angle of  $90^\circ$ .

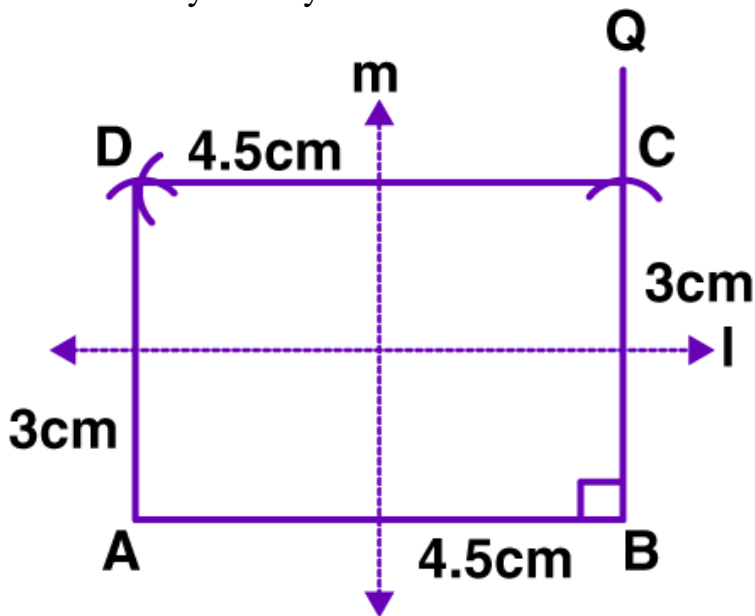
Step 3: Taking B as centre and with radius = 3 cm, cut an arc on BQ, mark it as point C.

Step 4: Now taking point C as centre and radius = 4.5 cm, draw an arc and with A as centre and radius = 3 cm, cutting the previous arc with marking that point as D.

Step 5: Join CD and AD.

Step 6: ABCD is a required rectangle.

The lines of symmetry:



The lines of symmetry = 2, i.e., the lines joining the midpoints of opposite sides.

**4. Construct a rhombus ABCD with  $AB = 5.3$  cm and  $\angle A = 60^\circ$ . Draw its line (or lines) of symmetry.**

**Solution:**

Steps to construct:

Step 1: Draw line segment  $AB = 5.3$  cm.

Step 2: Construct an angle of  $60^\circ$  at point A.

Step 3: With A as centre, radius = 5.3 cm draw an arc on AX. Mark the point of intersection as D.

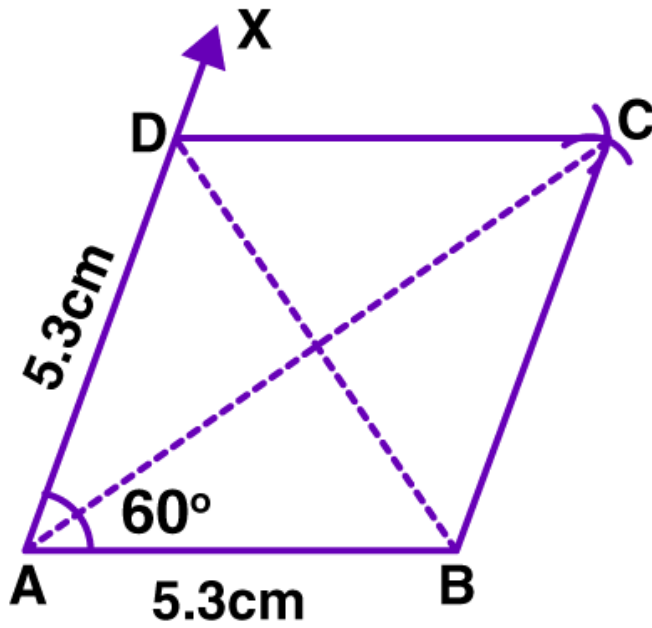
Step 4: With D as the centre and radius = 5.3 cm draw an arc. Mark that point as C.

Step 5: With B as centre and same radius, draw another arc, such that it intersects the previous at point C.

Step 6: Join CD and BC.

Step 7: ABCD is a required rhombus.

The lines of symmetry:



Lines of symmetry in rhombus = 2, i.e., the diagonals of the rhombus.

## OBJECTIVE TYPE QUESTIONS

### 1. Fill in the blanks:

- (i) A figure has ..... symmetry if it is its own image under a reflection.
- (ii) A kite has ..... line(s) of symmetry.
- (iii) A parallelogram has ..... line(s) of symmetry.
- (iv) The centre of rotation of an equilateral triangle is the point of intersection of its .....
- (v) The centre of rotation of a rhombus is the point .....
- (vi) A regular polygon of n-sides has ..... number of lines of symmetry.
- (vii) Angle of rotational symmetry in an equilateral triangle is .....
- (viii) Angle of rotational symmetry in a regular pentagon is .....
- (ix) If after a rotation of  $45^\circ$  about a fixed point the figure looks exactly the same, then the order of rotational symmetry is .....

### Solution:

- (i) A figure has line symmetry if it is its own image under a reflection.
- (ii) A kite has one line(s) of symmetry.
- (iii) A parallelogram has none line(s) of symmetry.
- (iv) The centre of rotation of an equilateral triangle is the point of intersection of its angle bisectors/altitudes/median.
- (v) The centre of rotation of a rhombus is the point of intersection of its diagonals.
- (vi) A regular polygon of n-sides has n number of lines of symmetry.
- (vii) Angle of rotational symmetry in an equilateral triangle is  $120^\circ$ .
- (viii) Angle of rotational symmetry in a regular pentagon is  $72^\circ$ .
- (ix) If after a rotation of  $45^\circ$  about a fixed point the figure looks exactly the same, then the order of rotational symmetry is 8.

### 2. State whether the following statements are true (T) or false (F) :

- (i) A parallelogram has diagonals as its lines of symmetry.
- (ii) A regular triangle has three lines of symmetry, one point of symmetry and has rotational symmetry of order 3.

**(iii) A, regular quadrilateral has four lines of symmetry, one point of symmetry and has . Rotational symmetry of order 4.**

**(iv) A parallelogram has no rotational symmetry.**

**(v) A regular pentagon has one point of symmetry.**

**(vi) The letter Z has one line of symmetry.**

**Solution:**

**(i)** A parallelogram has diagonals as its lines of symmetry.

The statement is False.

Answer:

A parallelogram has no line of symmetry.

**(ii)** A regular triangle has three lines of symmetry, one point of symmetry and has rotational symmetry of order 3.

The statement is False.

Answer:

A rectangle has 2 lines of symmetry,  
one point of symmetry and rotational symmetry of order 2.

**(iii)** A regular quadrilateral has four lines of symmetry, one point of symmetry and has rotational symmetry of order 4.

The statement is True.

**(iv)** A parallelogram has no rotational symmetry.

The statement is False.

Answer:

A parallelogram has rotational symmetry of order 2.

**(v)** A regular pentagon has one point of symmetry.

The statement is False.

Answer:

A regular pentagon has no point of symmetry.

**(vi)** The letter Z has one line of symmetry.

The statement is False.

Answer:

The letter Z has no line of symmetry.

### Multiple Choice Questions

Choose the correct answer from the given four options (3 to 6):

**3. The number of lines of symmetry which a quadrilateral cannot have**

- (a) 1
- (b) 2
- (c) 3
- (d) 4

**Solution:**

Number of lines of symmetry in a quadrilateral cannot have three.

Option (c)

**4. A possible angle of rotation of a figure having rotational symmetry of order greater than or equal to 2 is**

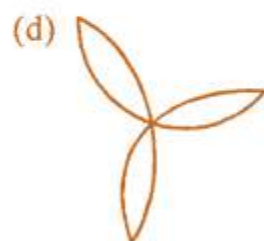
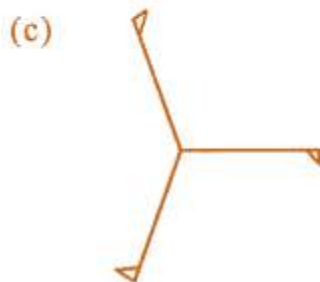
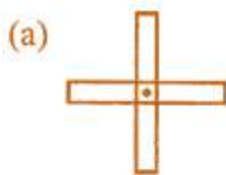
- (a)  $36^\circ$
- (b)  $144^\circ$
- (c)  $150^\circ$
- (d)  $360^\circ$

**Solution:**

Two possible angles of rotation of a figure having rotational symmetry of order greater than or equal to 2 is  $36^\circ$ .

Option (a)

**5. The figure which does not have both line and rotational symmetry is**



**Solution:**

The figure which does not have both lines and rotational symmetry is a figure given in Option (c).

6. The letter which has both line and rotational symmetry is

(a) **H**

(b) **M**

(c) **S**

(d) **Y**

**Solution:**

The letter which has both lines and rotational symmetry is **H**.

Option (a)

