Grade VII

Lesson : 14 Symmetry

Objective Type Questions

I. Multiple choice questions

1. An equilateral triangle has a rotational symmetry : of order:

a) 4 b) 3 c) 2 d) none of these

2. A rectangle has the number of lines of symmetry:

a) 3 b)2 c) 4 d) 5

3) A circle has :

a) no line of symmetry b) Four lines of symmetry

c) Two lines of symmetry d) An unlimited number of lines of symmetry

4) A scalene triangle has :

a) No line of symmetry b) One line of symmetry

c) Two lines of symmetry d) None of these

5. A regular pentagon has how many lines of symmetry?

a)3 b)4 c) 5 d)6

6. Which of the following letters of the English alphabet has reflectional symmetry about a vertical mirror?

a) A b) B c) C d) D

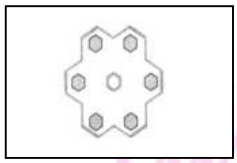
7. What is the order of rotational symmetry of a square?

a) 3 b) 4 c) 5 d) 6

1) b	2) b	3)d	4) a	5) c	6) a	7) b

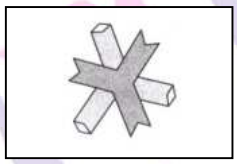
II. Multiple choice questions

1. The number of lines of symmetry in the figure given below is (HOTS, NCERT)



a) 4 b) 8 c) 6 d) infinitely many

2. The number of lines of symmetry is

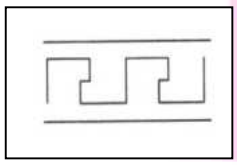


a) 1 b) 3 c) 6 d) infinitely many

3. The order of rotational symmetry in the figure given below is (HOTS, NCERT)

a) 4 b) 8 c) 6 d) infinitely many

4. The order of rotational symmetry in the figure given below is (NCERT)

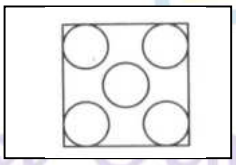


a) 4 b) 2 c) 1 d) infinitely many

5. The angle of rotation in equilateral triangle is (HOTS, NCERT)

a) 45^0 b) 60^0 c) 90^0 d) 180^0

6. The angle of rotation for the figure given below (NCERT)



a) 60^0 b) 70^0 c) 90^0 d) 120^0

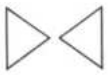
7. In the word "MATHS', which of the following pairs of letters shows rotational symmetry?

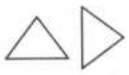
a) M and T b) H and S c) A and S d) T and S

8. Which of the following as a line of symmetry?

(a)  (b)  (c)  (d) 

9. Which of the following are reflections of each other?

(a)  (b) 

(c)  (d) 

10. Which of the following letters of English alphabets have more than 2 lines of symmetry?

a) Z b) O c) E d) H

IV. Multiple choice questions

1. How many lines of symmetry are there in an equilateral triangle?

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

2. How many lines of symmetry are there in a square?

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

3. How many lines of symmetry are there in rectangle?

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

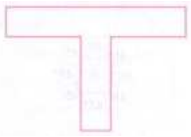
4. How many lines of symmetry are there in a regular pentagon?

a) 1 b) 2 c) 3 d) 5

5. How many lines of symmetry are there in a regular hexagon?

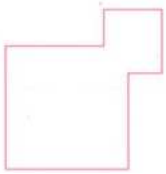
a) 2 b) 4 c) 6 d) 3

6. How many lines of symmetry are there in a regular hexagon?



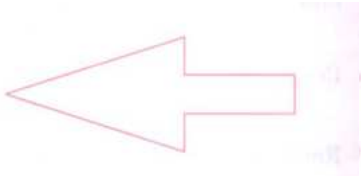
a) 1 b) 2 c) 3 d) 4

7. How many lines of symmetry are there in the following figure?



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

8. How many lines of symmetry are there in the following figure?



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

9. How many lines of symmetry are there in the following figure?

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

10. How many lines of symmetry are there in the following figure?

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

11. How many lines of symmetry are there in the following figure?

a) 1 b) 2 c) 3 d) None of these

12. How many lines of symmetry are there in the following figure?

a) 1 b) 2 c) 3 d) Infinitely many

13. How many lines of symmetry are there in an isosceles triangle?

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

14. How many lines of symmetry are there in a scalene triangle?

a) 1 b) 04 c) 2 d) 4

15. How many lines of symmetry are there in a rhombus?

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

16. How many lines of symmetry are there in a parallelogram?

a) 0 b) 1 c) 2 d) None of these

17. How many lines of symmetry are there in a quadrilateral?

a) 0 b) 2 c)3 d) 4

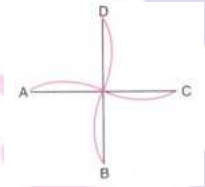
18. The order of rotational symmetry of an equilateral triangle is?

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

19. The order of rotational symmetry of a square is?

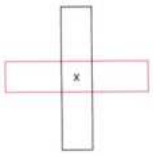
a) 1 b) 2 c) 3 d) 4

20. What is the order of the rotational symmetry of the following figure?



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

21. The order of rotational symmetry of a following figure about the point marked x (cross) is

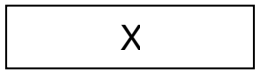


a) 1 b) 2 c) 3 d) 4

22. The order of rotational symmetry of the following figure about the point marked x is.

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

23. The order of rotational symmetry of the following figure about the point marked x is.



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

24. Which of the following letter of English alphabet has reflectional symmetry about a vertical mirror?

a) H b) J c) Z d) P

25. Which of the following letter of English alphabet has reflectional symmetry about a horizontal mirror?

a) H b) K c) M d) W

26. Which of the following letter of English alphabet has reflectional symmetry about a horizontal mirror?

a) O b) Y c) T d) L

27. The quadrilateral which has both line and rotational symmetry of order more than 1 is

a) isosceles triangle b) rhombus

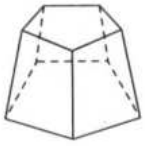
c) scalene triangle d) square

1. c	2. d	3. b	4. d	5. c	6. a	7. a	8. a	9. d	10. b
11.a	12. d	13. c	14. b	15. b	16. a	17. a	18. c	19. d	20. a
21. a	22. c	23. a	24. a	25. a	26. a	27.d			

Hints / Solutions

I. Fill in the Blanks

1. The following figure has____vertices_____edges and _____faces.



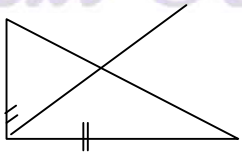
The given figure has 10 vertices, 15 edges and 7 faces.

2. Rotation turns an object about a fixed point. This fixed point is called.

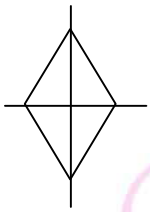
Centre of rotation

3. In an isosceles right angled triangle, the number of lines of symmetry is (NCERT)

In an isosceles right angled triangle, the number of lines of symmetry is one i.e.



4. Rhombus is a figure that has ____lines of symmetry and has a rotational symmetry of order **4** .



5. **Isosceles** triangle is a figure that has a line of symmetry, but lacks rotational symmetry. (NCERT)

6. **Quadrilateral** is a figure that has neither a line of symmetry nor a rotational symmetry.

   Quadrilateral not any special type of quadrilateral, square, rectangle etc., is a figure that has neither a line of symmetry nor a rotational symmetry.

7. Each of the letters H,N,S and Z has a rotational symmetry of order **2** . (NCERT)

8. Order of rotational symmetry of a rectangle is **2** .

9. Order of rotational symmetry of a circle is **infinite** . (NCERT)

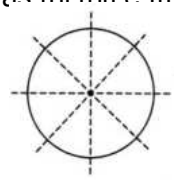
10. Line of symmetry for an angle is its **bisector**.

11. Order of rotational symmetry of is  **8**.

I. True or False

1. A circle has two lines of symmetry . (NCERT)

   False, a circle has infinite lines of symmetry i.e.

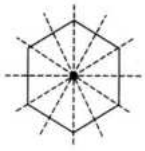


2. An angle has two lines of symmetry.

   False , an angle has only one lines of symmetry as its bisector.

3. A regular hexagon has six lines of symmetry.

   True, a regular hexagon has six lines of symmetry.

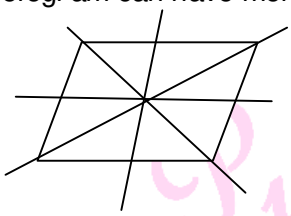


4. An isosceles trapezium has one line of symmetry.

   True, an isosceles trapezium has one line of symmetry.

5. A parallelogram has two lines of symmetry. (NCERT)

False, a parallelogram can have more than two lines symmetry. E.g. square.



6. Order of rotational symmetry of a rhombus is four.

False, Order of rotational symmetry of a rhombus is 2. Which means the rhombus is rotated in the clockwise direction to complete one rotation.

7. An equilateral triangle has six lines of symmetry. (NCERT)

False, An equilateral triangle has three lines of symmetry

8. Order of rotational symmetry of a semi-circle is two.

False, semi-circle has no rotational symmetry

9. The number of line of symmetry of a regular polygon is equal to the vertices of the polygon.

True, the number of line of symmetry of a regular polygon is equal to the vertices of the polygon. E.g. Pentagon has 5 vertices , so the number of lines of symmetry is five.

10. The angle of rotational symmetry of a figure is 4 and the angle of rotation is 180^0 only.

False, if angle of rotational symmetry of a figure is 4, then the angle of rotation is $\frac{360^0}{4} = 90^0$.

I. Match the following

Column A	Column B
a) A half-turn means rotation by	i) 180^0
b)A quarter – turn means rotation by	ii) side and angles
c) A complete turn means rotation by	iii) 90^0
d) Regular polygon have equal	iv) 360^0

a. (i)	b.(iii)	c. (iv)	d. (ii)

Very Short Answer Questions

1. **How many lines of symmetry are there in a rectangle?**

   Two

2. **How many lines of symmetry are there in a square?**

   Four

3. **How many lines of symmetry are there in a circle?**

   Infinite

4. **How many lines of symmetry are there in a isosceles triangle?**

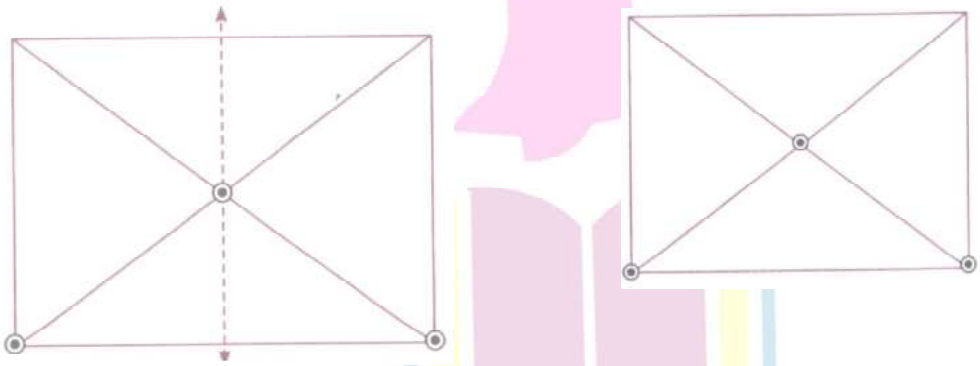
   One

5. **Name a solid which has only one vertex**

   Cone

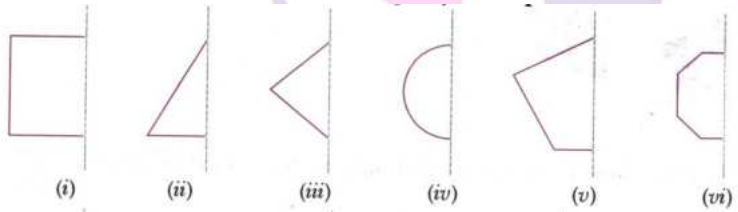
Very Short Answer Questions

1. **Copy the figure with punched holes and find the axes of symmetry for (NCERT)**

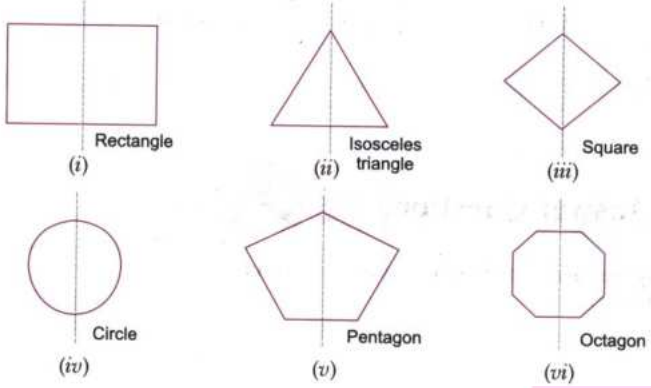


2. Give the line (s) of symmetry, find the other hole(s). (NCERT)

3. In the following figures, the mirror line (i.e., the line of symmetry) is given as a dotted line. Complete each figure performing reflection in the dotted (mirror) line (You might perhaps place a mirror along the dotted line and look into the mirror for the image. Are you able to recall the name of the figures you complete?

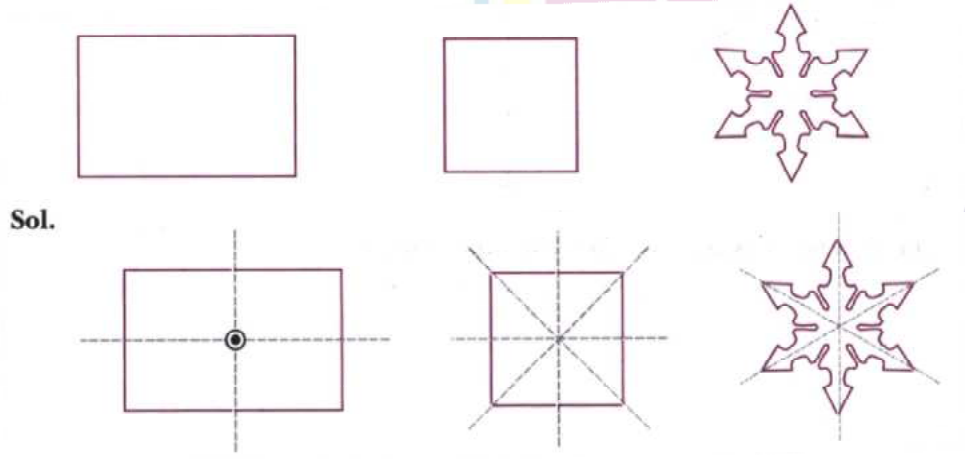


Sol.



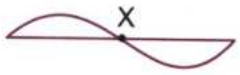
4.The following figures have more than one line of symmetry. Such figures are said to have multiple lines of symmetry.

Draw multiple lines of symmetry in each of the following figures:



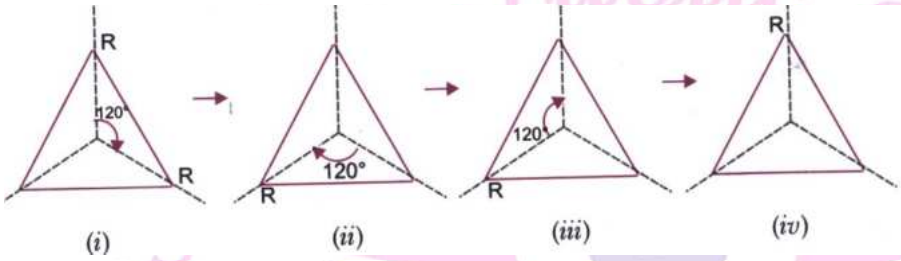
Sol.

5. Does this shape (Figure) have rotational symmetry about the marked point?



Yes, the figure above has rotational symmetry about the marked point (x)

6. Can you now tell the order of the rotational symmetry for an equilateral triangle? (NCERT)



There are exactly three positions where the triangle looks the same.

7. If a figure has two or more lines of symmetry, should it have rotational symmetry of order more than I?

Yes.

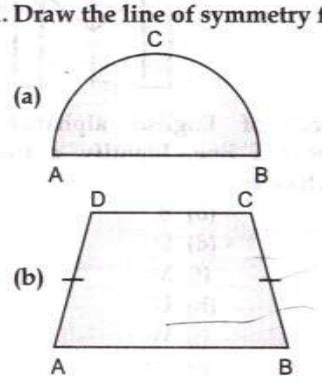
8. Can we have a rotational symmetry of order more than I whose angle of rotation is

i) 45^0? ii) 17^0?

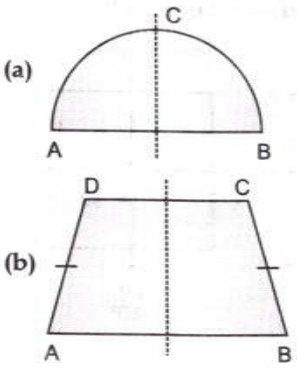
i) Yes ii) No.

I Short Answer Questions

1. Draw the line of symmetry for the given shapes :

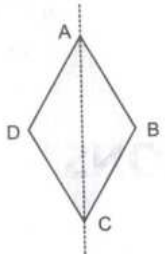


Sol. (a)



2. Does a kite has a line of symmetry, if yes show it ?

Yes, there is one line of symmetry



3. What other names can be given to the line of symmetry of :

(a) An isosceles triangle? **B) A Circle**

a) Median of an isosceles triangle

b) Diameter of a circle

4. State the number of lines of symmetry for the following :

a) A regular hexagon

b) A parallelogram

a) A regular hexagon has six lines of symmetry.

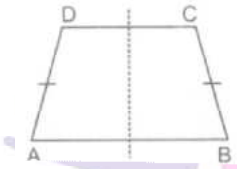
b) A quadrilateral (parallelogram) in general has no line of symmetry.

5. Does every trapezium have a line of symmetry? If any, show it.

No, generally trapezium has no line of symmetry, leaving isosceles trapezium.

In isosceles trapezium,

AD=BC. So, there is one line of symmetry.



6. State about the rotational symmetry of a square.

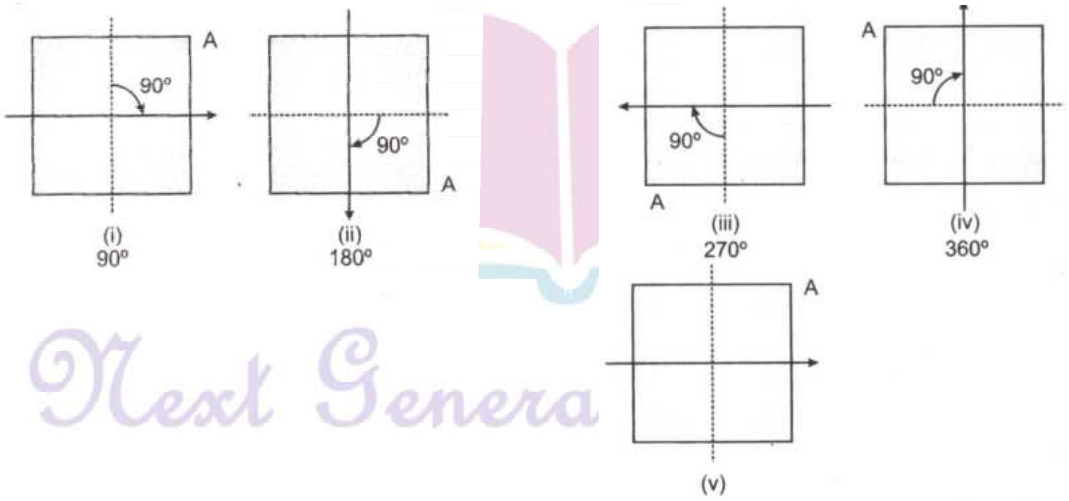
A square has a rotational symmetry of order 4 about its centre, In this case:

a) The centre of rotation is the centre of the square.

b) The angle of rotation is 90^0.

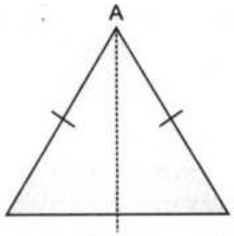
c) The direction of rotation is clock wise.

d) The order is 4.

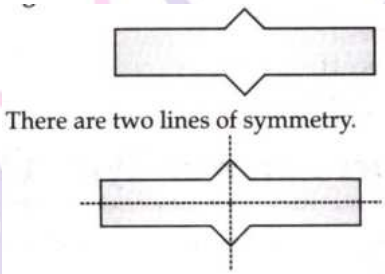


7. Does an isosceles triangle has a line of symmetry. If any, show it

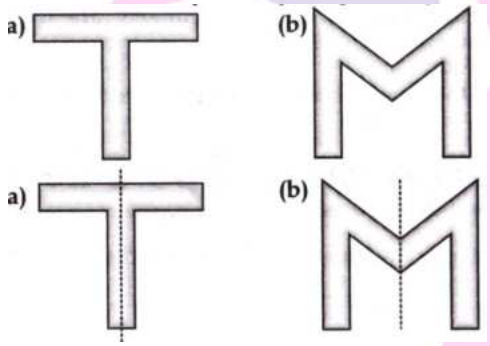
Isosceles triangle has only one line of symmetry.



8. How many line of symmetry does the given figure have? Draw these lines.

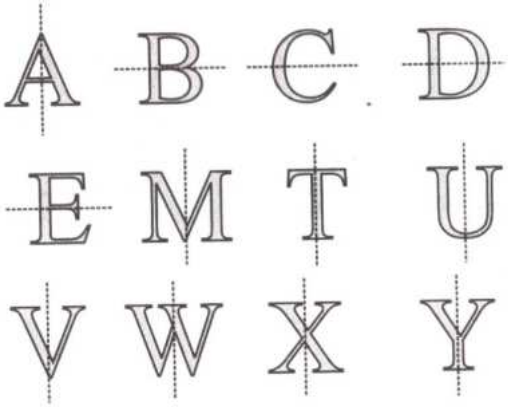


9. Draw the line of symmetry for given figures:



10. Following letters of English alphabet are symmetrical about a line. Identify, a line of symmetry in each case.:

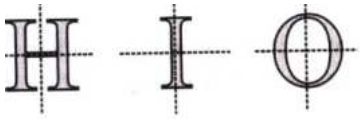
a) A b) B
c) C d) D
e) E f) M
g) T h) U
i) V j) W
k) X l) Y



11. Each of the following letters from English alphabet has two lines of symmetry. Identify lines of symmetry in each case.

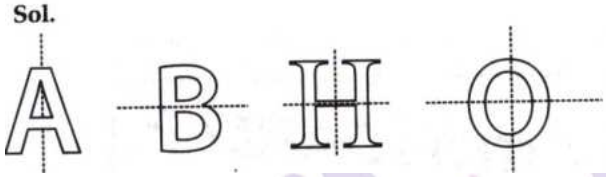
a) H b) I c) O

The dotted lines are lines of symmetry in each case.



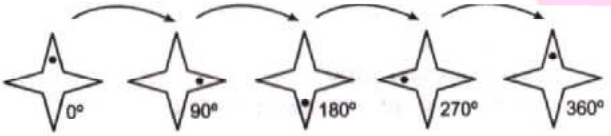
12. Draw all the lines of symmetry for the following letters if they exist.

Sol.



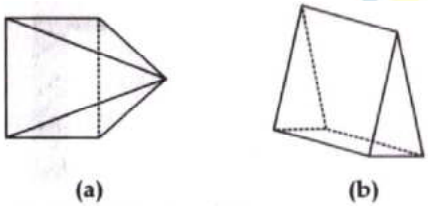
13. State whether the figure shows rotational symmetry. If yes, then what is the order of rotational symmetry.

The given figures shows rotational symmetry. The order of symmetry =4, Which is clear from the following figures.



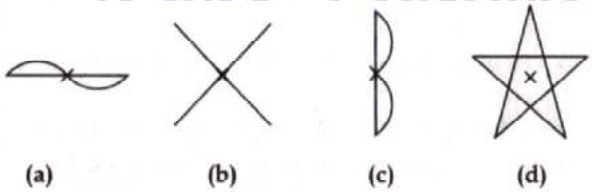
Note : the dot is placed just to identify different positions of the figure.

14. Identify the following figures :



a) Rectangular pyramid b) Triangular Prism

15. Which of the following shapes have rotational symmetry about the marked point?

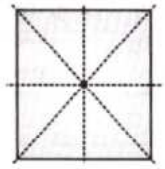


We know that, after a rotation, if an object looks exactly the same as original, then it has rotational symmetry.

Here, figures (b), and (d) have rotation of symmetry.

16. Name the quadrilateral which have both line and rotational symmetry of order more than 1.

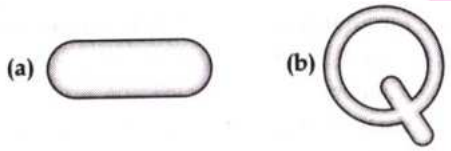
The name of quadrilateral having both line of symmetry and rotational symmetry of order more than 1 is square. It has 4 lines of symmetry and rotational symmetry of order 4.



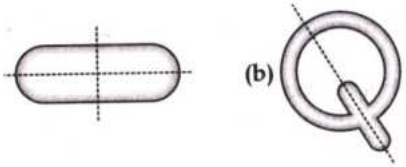
17. After rotating by 60^0 about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure.

After rotating by 60^0 about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure at angles 120^0, 180^0, 240^0, 300^0, 360^0 respectively.

18. Draw all lines of symmetry for each of the following figures.



Sol. (a) (b)



❑❑❑

I Short Answer Questions

1. State the number of lines of symmetry for the following figures: (NCERT)

i) An equilateral triangle ii) A regular hexagon

iii) A square iv) A parallelogram

i) An equilateral triangle has 3 lines of symmetry

ii) A regular hexagon has 6 lines of symmetry

iii) A square has 4 lines of symmetry.

iv) A parallelogram has o lines of symmetry

2. Give three examples of shapes with no line of symmetry. (NCERT)

i) Scalene triangle b) The letter F c) A parallelogram

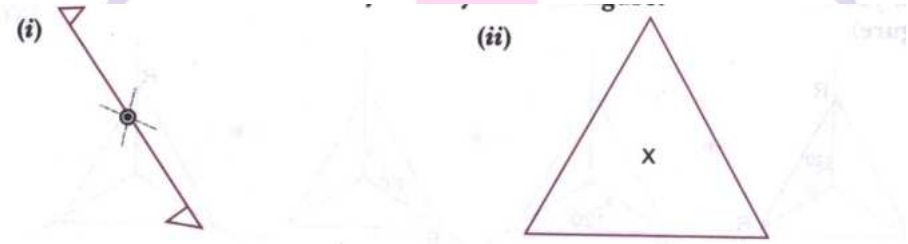
3. What other name can you give to the line of symmetry of (NCERT)

i) an isosceles triangle?

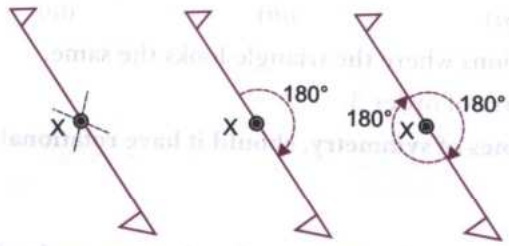
ii) A circle?

i) Median ii) Diameter

4. Give the order of rotational symmetry for each figure.

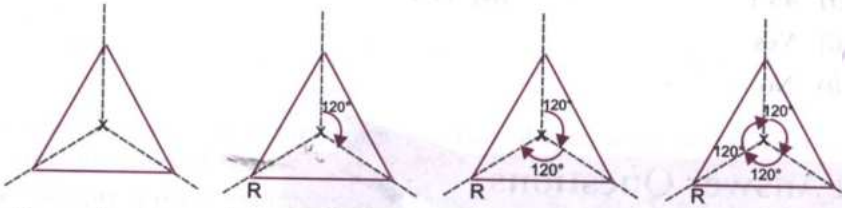


Sol. (i)



It has a rotational symmetry of order 2 as it requires two rotations. Eac
180° about point (X) comes back to its original position.

(ii)



It requires 3 rotations, each through an angle of 120°, to come back t
position.

∴ It has a rotational symmetry of order 3.

5. Name any two figures that have both line symmetry and rotational symmetry

An equilateral triangle (i)

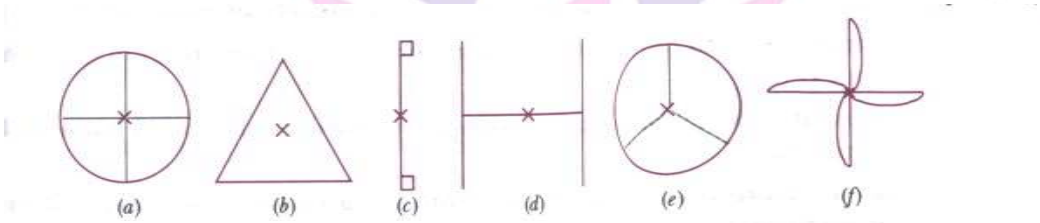
Circle (ii)

6. Name the quadrilaterals which have both line and rotational symmetry of order more than 1.

The square, rectangle and a rhombus are the quadrilaterals having both line symmetry and rotational symmetry.

7. If, after a rotation, an object looks exactly the same, we say that it has a rotational symmetry.

The figure will look same as its original position at 120^0, 180^0, 240^0, 300^0, 360^0 respectively.



The figure a, b, d, e and f have rotational symmetry of order more than 1.

Long Answer Questions

1.What letters of the English alphabet have reflectional symmetry (i.e. symmetry) related to mirror reflection) about (NCERT).

i) a Vertical mirror ii) a horizontal mirror

iii) both horizontal and vertical mirrors

i) Symmetrical about vertical mirror are :

A,H,I ,M,O,T,U,V,W,X and Y

ii) Symmetrical about horizontal mirror are

B,C,D,E,H,I ,O and x

iii) Symmetrical about both horizontal and vertical mirrors.

O, X ,H, I

3. Draw, wherever possible, a rough sketch of

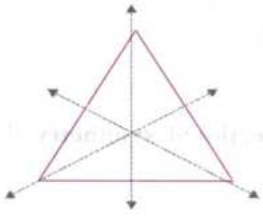
i) a triangle with both line and rotational symmetries of order more than 1.

ii) a triangle with only line symmetry and no rotational symmetry of order more than 1.

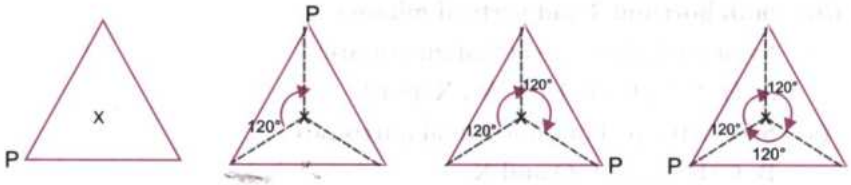
iii) a quadrilateral with a rotational symmetry of order more than 1 but not a line symmetry.

iv) a quadrilateral with a line symmetry but not a rotational symmetry or order more than 1.

(i) An equilateral triangle has 3 lines of symmetry.

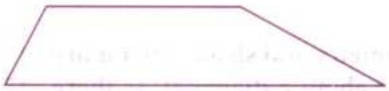


It has rotational symmetry also of order 3.



(*ii*) It is not possible to have such a triangle.

(*iii*)



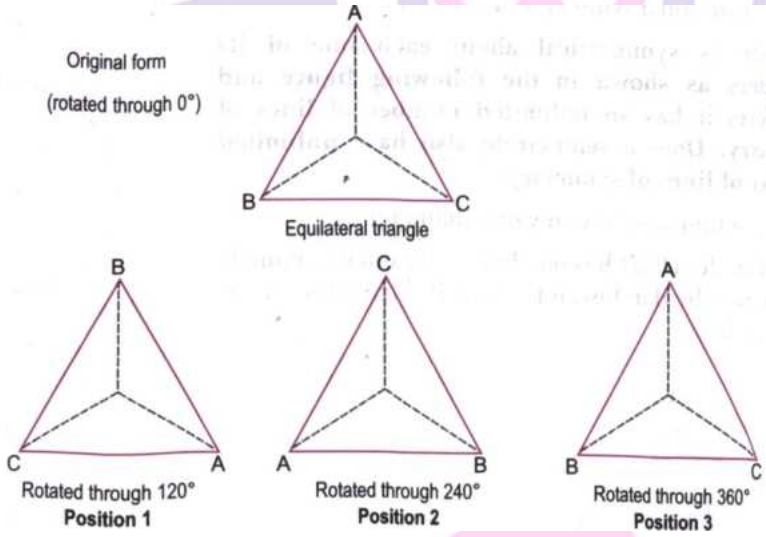
(*iv*) Not possible.

4. Fill in the blanks :

Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
Square			
Rectangle			
Rhombus			
Equilateral Triangle			
Regular Hexagon			
Circle			
Semi-circle			

Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
Square	Point of intersection of diagonals	4	90^0
Rectangle	Point of intersection of diagonals	4	90^0
Rhombus	Point of intersection of diagonals	4	90^0
Equilateral Triangle	Point of intersection of diagonals	3	120^0
Regular Hexagon	Point of intersection of diagonals	6	60^0
Circle	Centre	Infinite	Every angle
Semi-Circle	Centre	4	90^0

5. Illustrate the rotation of an equilateral triangle and find its order of rotational order.

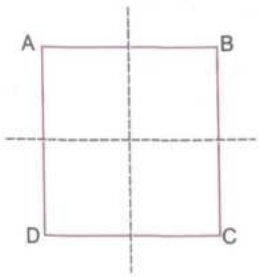


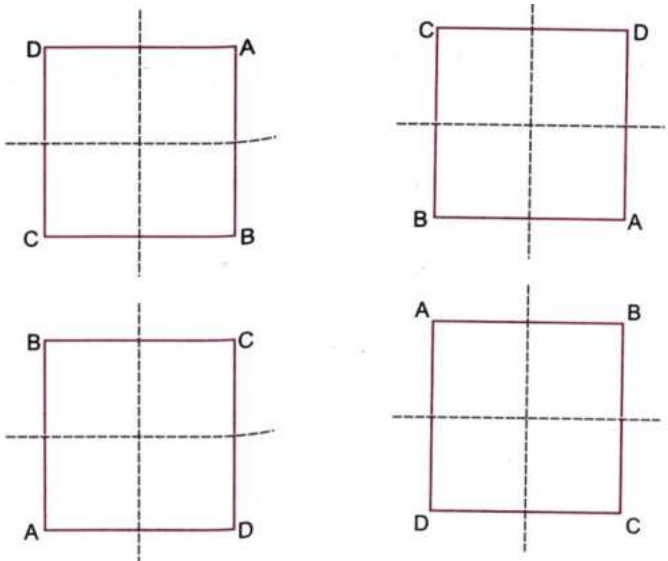
Since, each of the above three positions fits into the original.

∴It has a rotational symmetry of order 3.

6. Find the order of the rotational symmetry of a square.

Let us consider a square ABCD

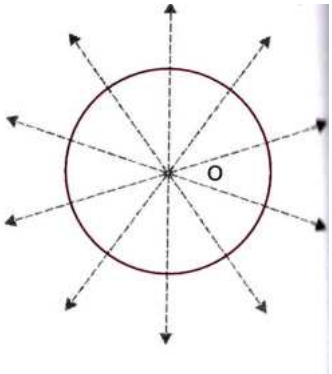




Obviously, each of the above four times, the figure fits on-to-itself.

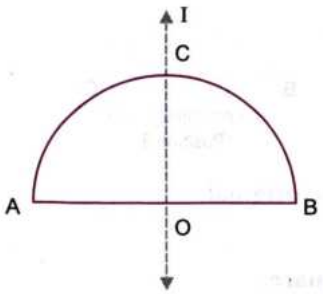
∴ It has a rotational symmetry of order 4.

7. A circle is symmetrical about each one of its diameters as shown in the following figure and therefore, it has an unlimited number of lines of symmetry. Does a semi-circle also have unlimited number of lines of symmetry?

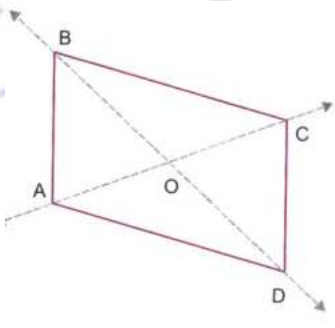


Since, a semi-circle has only one diameter.

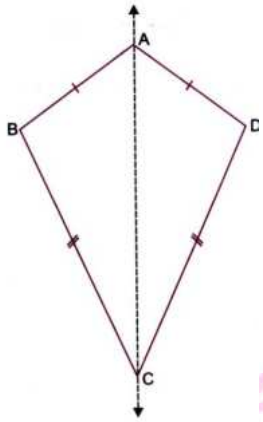
∴ A semi-circle ABCD has one line of symmetry, namely the perpendicular bisector (1) of its diameter AB as shown below.



8. The adjoining figure is a rhombus. It is symmetrical about each one of its diagonals, i.e. there are two lines of symmetry for rhombus. How many lines of symmetry can there be in a kite ABCD.



The following figure represents a kite ABCD.



Since, in the kite (shown in the figure) ABCD.

$\overline{AB} = \overline{AD}$ AND $\overline{BC} = \overline{CD}$.

Obviously, it is symmetrical about its diagonal AC.

Thus, it has only one line of symmetry.