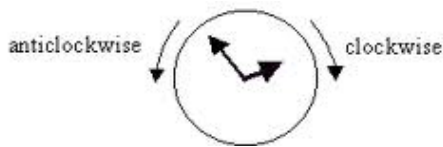# ROTATIONAL SYMMETRY

Created: Monday, 12 September 2011 07:17 | Published: Monday, 12 September 2011 07:17 | Written by Super User | Print

Introduction

When an object rotates in the clockwise direction that is in the direction of motion of hands of a clock, rotation is called clockwise rotation; otherwise it is called anti clockwise rotation.

The angle through which an object rotates or turns about a fixed point is known as the angle of rotation.

A figure is said to have rotational symmetry if it fits onto itself more than once during a full turn that is rotation through 360°.

Order of Rotational Symmetry

The number of times a figure fits onto itself in one full turn is called the order of rotational symmetry.
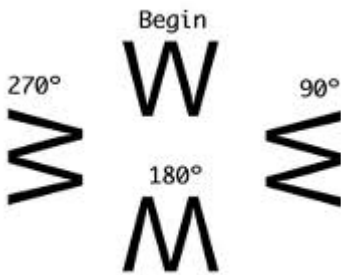
If we rotate a figure through 90° in clockwise direction and the same figure is rotated through 270° in anticlockwise direction both the above cases are equivalent.

Same way, if a figure is rotated through 180° in clockwise direction is the same as rotating it through 180° in anticlockwise direction that is 180° rotation in clockwise direction = 180° rotation in anticlockwise direction.

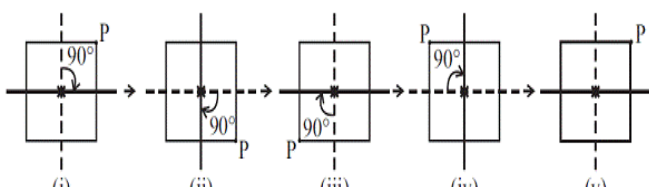Now we will discuss the rotational symmetry for square in detail:

Figure (i) is the initial position. Then it is rotated by 90° about

the centre which leads to figure (ii). Note the position of P now.

Now we again rotate through 90° and get figure (iii). In this way, when we complete four quarter-turns, the square reaches its original position. It now looks the same as (i). This can be seen with the help of the positions taken by P.

Thus a square has a rotational symmetry of order 4 about its centre. In this case,

(i) The centre of rotation is the centre of the square.
(ii) The angle of rotation is 90°.
(iii) The direction of rotation is clockwise.
(iv) The order of rotational symmetry is 4.

Let's note the Center of rotation and order of rotational symmetry for the following figures:

1. Rectangle:

Center of rotation – Intersection of Diagonals
Order of Rotational Symmetry – 2

2. Equilateral Triangle:

Center of rotation – Centroid
Order of Rotational Symmetry – 3

3. Regular Hexagon:

Center of rotation – Center of the hexagon
Order of Rotational Symmetry – 6

4. Circle:

Center of rotation – Center
Order of Rotational Symmetry – Unlimited

5. Parallelogram:

Center of rotation – Intersection of Diagonals
Order of Rotational Symmetry – 2

6. Rhombus:

Center of rotation – Intersection of Diagonals

Try it yourself:

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

Now try it yourself! Should you still need any help,click here to schedule live online session with e Tutor!

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Reference Links:

- http://en.wikipedia.org/wiki/Angle_of_rotation
- http://en.wikipedia.org/wiki/Rotational_symmetry
- http://wiki.answers.com/Q/How_many_order_of_rotational_symmetry_does_a_heptagon_have
- http://wiki.answers.com/Q/If_a_square_has_rotational_symmetry_what_is_the_angle_of_rotation
- http://www.answers.com/topic/center-of-rotation

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