MATHEMATICS

Class-7th

Chapter-14

Symmetry

Exercise-14.3

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Exercise 14.3

Question 1:

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

Answer 1:

Circle and Square.

Question 2:

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.

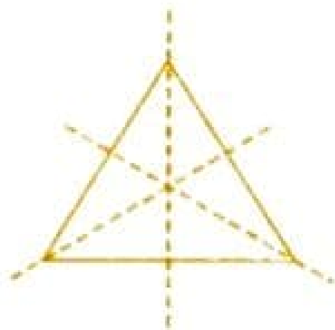
(iii) a quadrilateral with a rotational symmetry of order more than 1 but not a line symmetry.

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

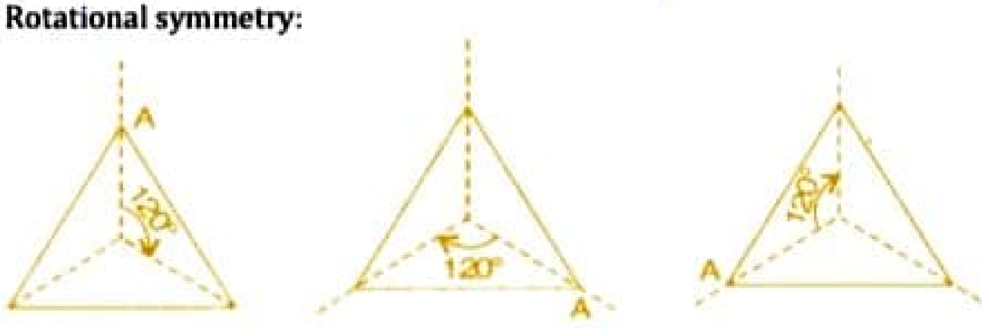
Answer 2:

(i) An equilateral triangle has both line and rotational symmetries of order more than 1.

Line symmetry:

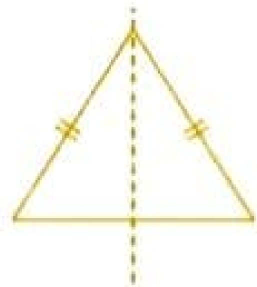


Rotational symmetry:

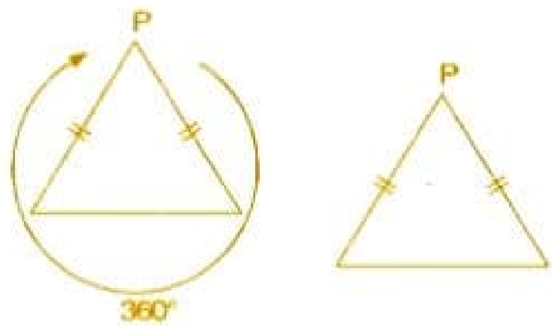


(ii) An isosceles triangle has only one line of symmetry and no rotational symmetry of order more than 1.

Line symmetry:



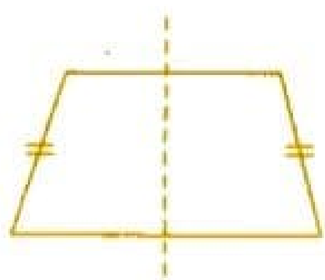
Rotational symmetry:



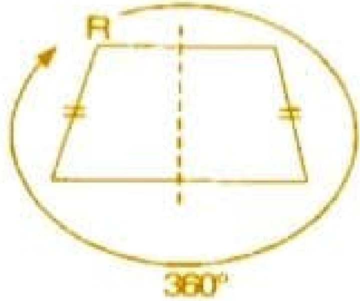
(iii) It is not possible because order of rotational symmetry is more than 1 of a figure, most acertain the line of symmetry.

(iv) A trapezium which has equal non-parallel sides, a quadrilateral with line symmetry but not a rotational symmetry of order more than 1.

Line symmetry:



Rotational symmetry:



Question 3:

In a figure has two or more lines of symmetry, should it have rotational symmetry of order more than 1?

Answer 3:

Yes, because every line through the centre forms a line of symmetry and it has rotational symmetry around the centre for every angle.

Question 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			

Answer 4:

Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
Square	Intersecting point of diagonals.	4	90°
Rectangle	Intersecting point of diagonals.	2	180°
Rhombus	Intersecting point of diagonals.	2	180°
Equilateral triangle	Intersecting point of medians.	3	120°
Regular hexagon	Intersecting point of diagonals.	6	60°
Circle	Centre	infinite	At every point
Semi-circle	Mid-point of diameter	1	360°

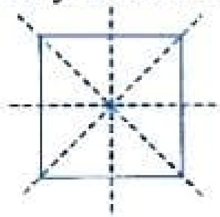
Question 5:

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

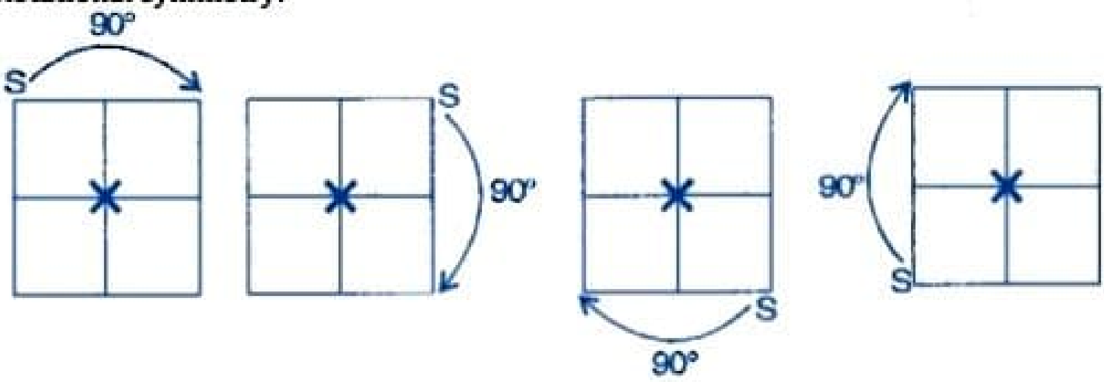
Answer 5:

Square has both line and rotational symmetry of order more than 1.

Line symmetry:



Rotational symmetry:



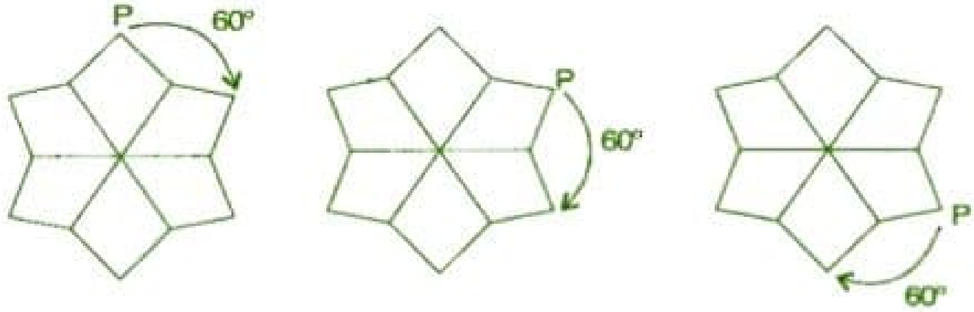
Question 6:

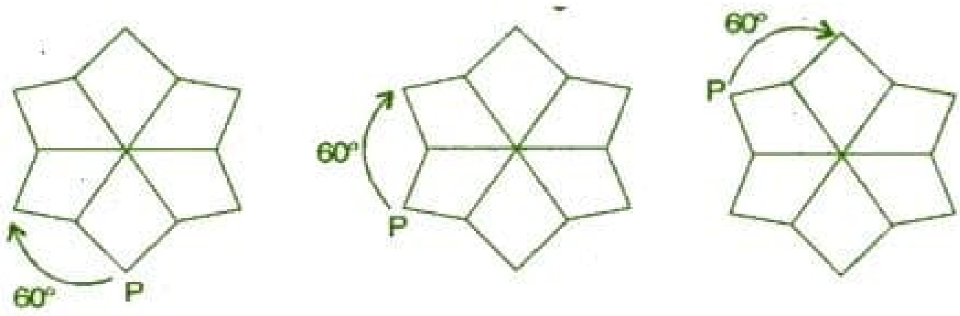
After rotating by 60° about a centre, a figure looks exactly the same as its original position. At what other angles will this happen for the figure?

Answer 6:

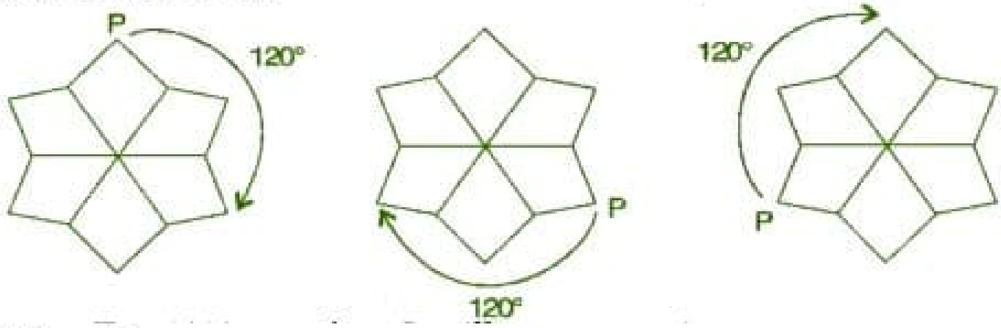
Other angles will be 120°, 180°, 240°, 300°, 360°.

For 60° rotation:
It will rotate six times.

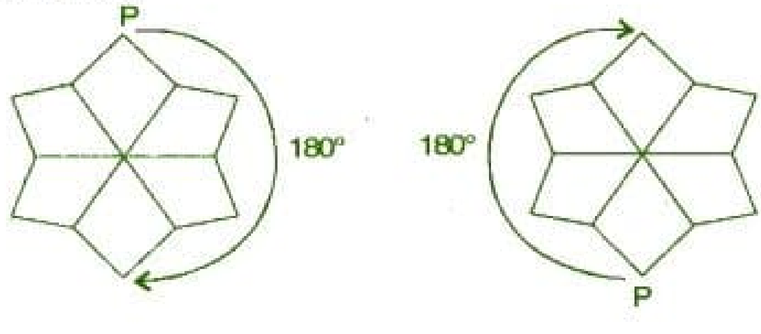




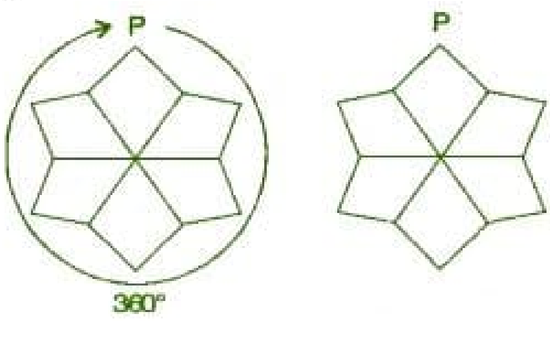
For 120° rotation:
It will rotate three times.



For 180° rotation:
It will rotate two times.



For 360° rotation:
It will rotate one time.



Question 7:

Can we have a rotational symmetry of order more than 1 whose angle of rotation is:

(i) 45° (ii) 17° ?

Answer 7:

(i) If the angle of rotation is 45°, then symmetry of order is possible and would be 8 rotations.

(ii) If the angle of rotational is 17°, then symmetry of order is not possible because 360° is not complete divided by 17°.