Chapter – 14
Symmetry

Exercise 14.3

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

Answer:

A square and a circle have both line symmetry and rotational symmetry.

2. Draw, wherever possible, a rough sketch of

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

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

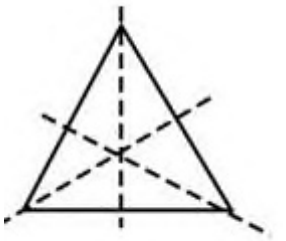
c) a quadrilateral with a rotational symmetry of order more than 1 but not a line symmetry.

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

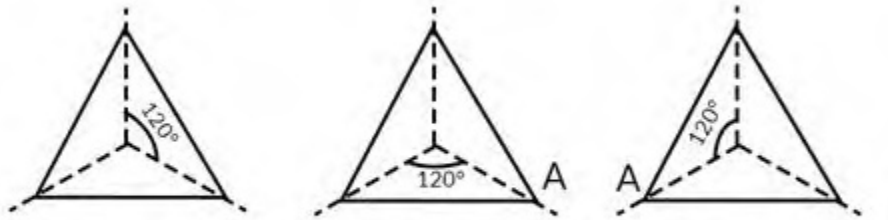
Answer:

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

Line Symmetry:

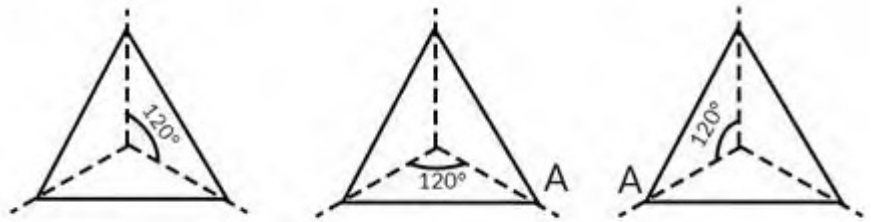


Rotational Symmetry:

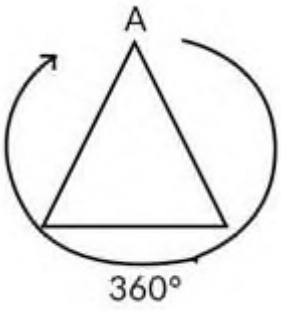


b) An isosceles triangle has only one line of symmetry and rotational symmetry of order 1.

Line Symmetry:



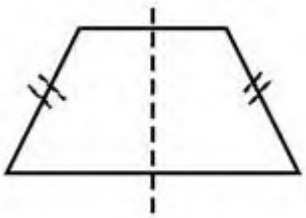
Rotational Symmetry:



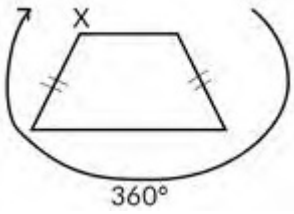
c) Not possible. A quadrilateral with a line symmetry may have rotational symmetry of order one but not more than one.

d) A trapezium has a line symmetry and a rotational symmetry of order one.

Line Symmetry:



Rotational Symmetry:



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

Answer:

Yes, a figure having two or more lines of symmetry will have rotational symmetry of order more than one since, both the line symmetry and the rotational symmetry are symmetric about the centre axis.

4. Fill in the blanks:

Shapes	Centre of Rotation	Order of Rotation	Angle of rotation
Square			
Rectangle			
Rhombus			

Equilateral triangle			
Regular Hexagon			
Circle			
Semi-circle			

Answer:

Shapes	Centre of Rotation	Order of Rotation	Angle of rotation
Square	Intersecting point of diagonals	4	90^o
Rectangle	Intersecting point of diagonals	2	180^o
Rhombus	Intersecting point of diagonals	2	180^o
Equilateral triangle	Intersecting point of medians	2	120^o
Regular Hexagon	Intersecting point of diagonals	6	60^o
Circle	Centre	Infinite	Every angle

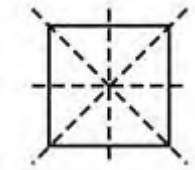
Semi-circle	Mid-point of diameter	1	360^o

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

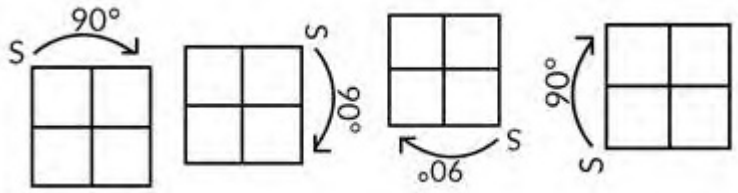
Answer:

A square has a line and rotational symmetry of order more than one.

Line Symmetry:



Rotational symmetry:



6. After rotation by 60^o about a center a figure looks exactly the same as its original position. At what other angles will this happen for the figure?

Answer:

The other angles will be 120°, 180°, 240°, 300°, 360°

Since, the figure is said to have rotational symmetry about same angle as the first one. Hence, the figure will look exactly the same when rotated by 60° from the last position.

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

(i) 45^o (ii) 17^o ?

Answer:

i. If the angle of rotation is 45°, then it is possible to have rotational symmetry of order more than one since, 360° is completely divisible by 45°.

ii. If the angle of rotation is 17°, then it is not possible to have rotational symmetry of order more than one since, 360° is not completely divisible by 17°.