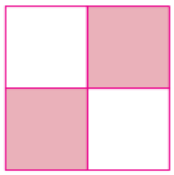
Unit 14 Transformation

Exercise 14.1

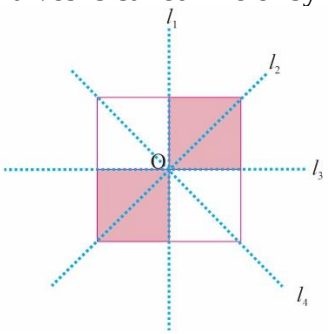
1. Draw lines of symmetry of the following figures if possible. Also find the order of rotational symmetry and center of rotation.

(i)



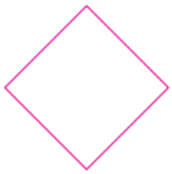
Square

Solution: A line which divides the shape into two halves is called line of symmetry. So



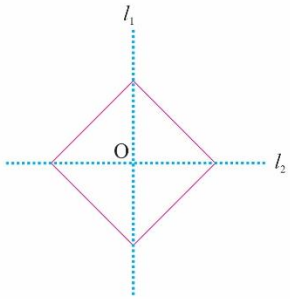
Where two lines of symmetry intersect each other, that point will be center of rotation.
Here center of rotation is O.
The order of rotation at angle of 90^o will be 2.

(ii)



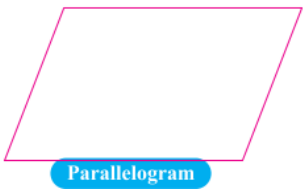
Rhombus

Solution: A line which divides the shape into two halves is called line of symmetry. So



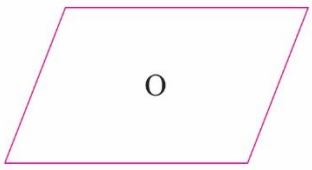
Where two lines of symmetry intersect each other, that point will be center of rotation.
Here center of rotation is O.
The order of rotation at angle of 180^o will be 2.

(iii)



Parallelogram

Solution: A line which divides the shape into two halves is called line of symmetry. So



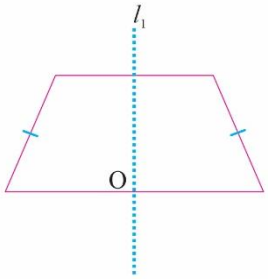
No line of symmetry

Where two lines of symmetry intersect each other, that point will be center of rotation. Here we can take any point as point of rotation and can find order of rotation. Here answer will not unique.

(iv)

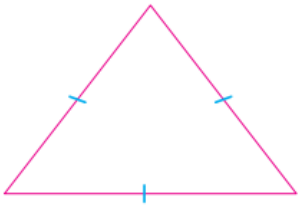
Trapezium

Solution: A line which divides the shape into two halves is called line of symmetry. So



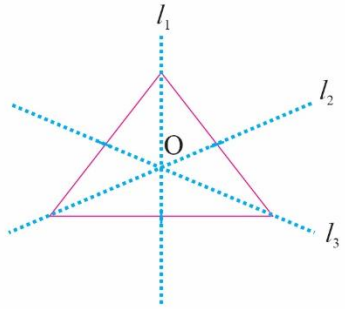
Where two lines of symmetry intersect each other, that point will be center of rotation. Here we can take any point as point of rotation and can find order of rotation. If we take 'O' as center then
the order of rotation at angle of 180^o will be 2.

(v)



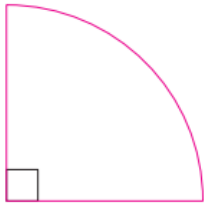
Equilateral Triangle

Solution: A line which divides the shape into two halves is called line of symmetry. So



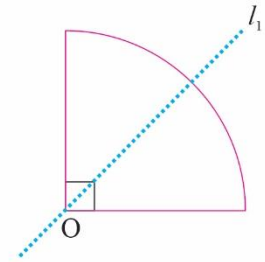
Where two lines of symmetry intersect each other, that point will be center of rotation.
Here O is the center of rotation and order of symmetry is 3.

(vi)



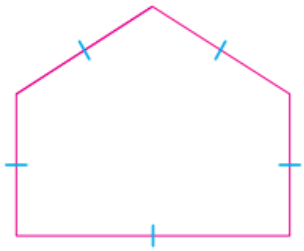
Quadrant

Solution: A line which divides the shape into two halves is called line of symmetry. So



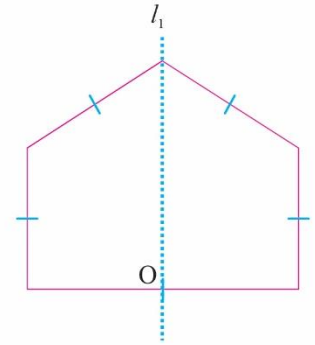
Where two lines of symmetry intersect each other, that point will be center of rotation. If we take 'O' as center then the order of rotation at angle of 90° will be 4.

(vii)



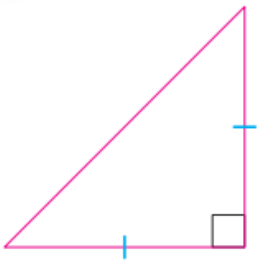
Pentagon

Solution: A line which divides the shape into two halves is called line of symmetry. So



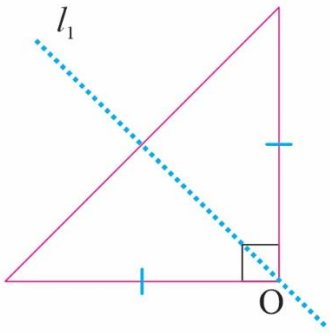
Where two lines of symmetry intersect each other, that point will be center of rotation. If we take 'O' as center then the order of rotation at angle of 90° will be 4.

(viii)



Right angled triangle

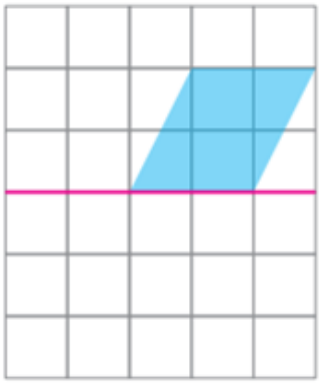
Solution: A line which divides the shape into two halves is called line of symmetry. So



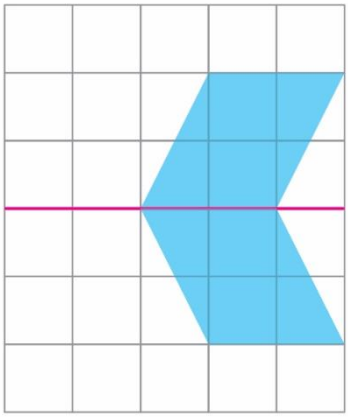
Where two lines of symmetry intersect each other, that point will be center of rotation. If we take 'O' as center then the order of rotation at angle of 90° will be 4.

2. Draw the image of the following diagrams using their lines of symmetry.

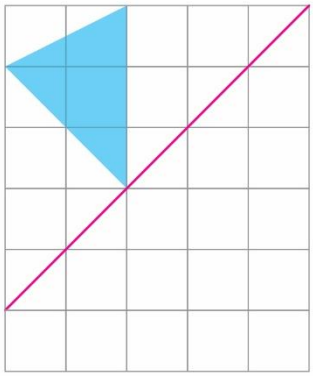
(i)



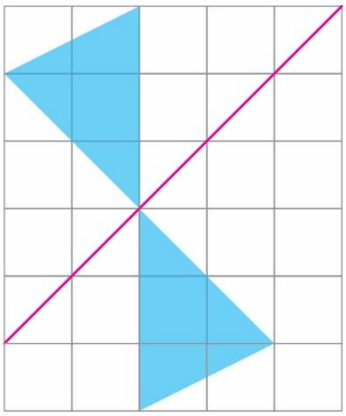
Solution: To draw the image of given diagram count the number of boxes and observe the corners of the diagram and flip it according to line of symmetry.



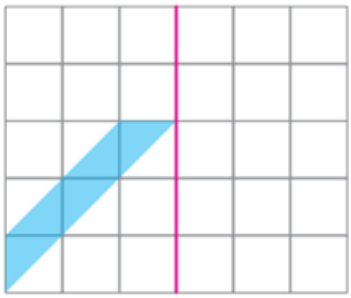
(ii)



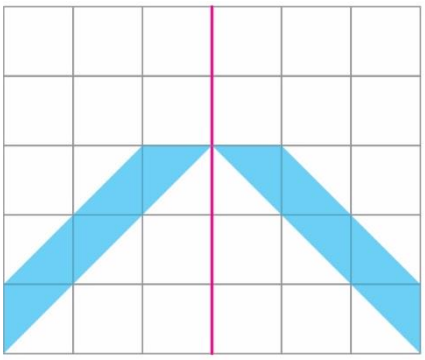
Solution: To draw the image of given diagram count the number of boxes and observe the corners of the diagram and flip it according to line of symmetry.



(iii)



Solution: To draw the image of given diagram count the number of boxes and observe the corners of the diagram and flip it according to line of symmetry.



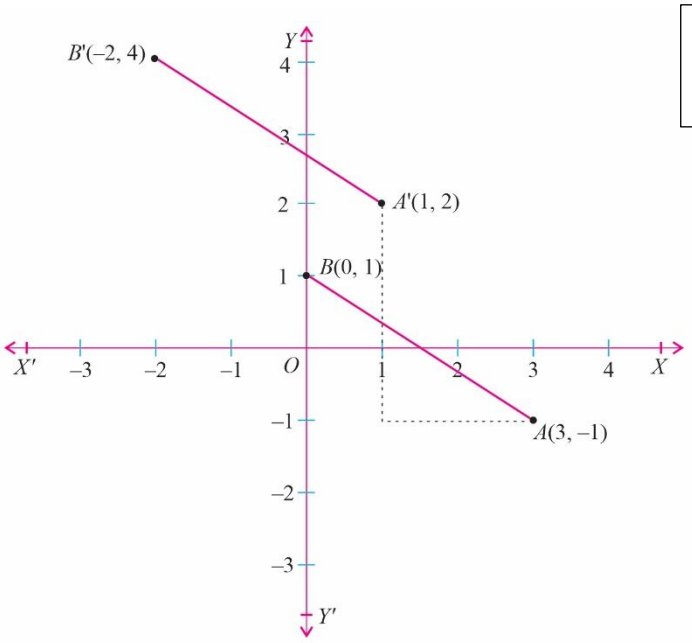
Exercise 14.2

Solve all questions on squared paper.

1. Translate a line segment AB with coordinates A(3, −1) and B(0, 1) to 2 units left and 3 units up.

Solution: First of all locate both points A and B on the squared paper and then translate 2 units left (means 2 boxes towards left) and 3units up (means 3 boxes upward).

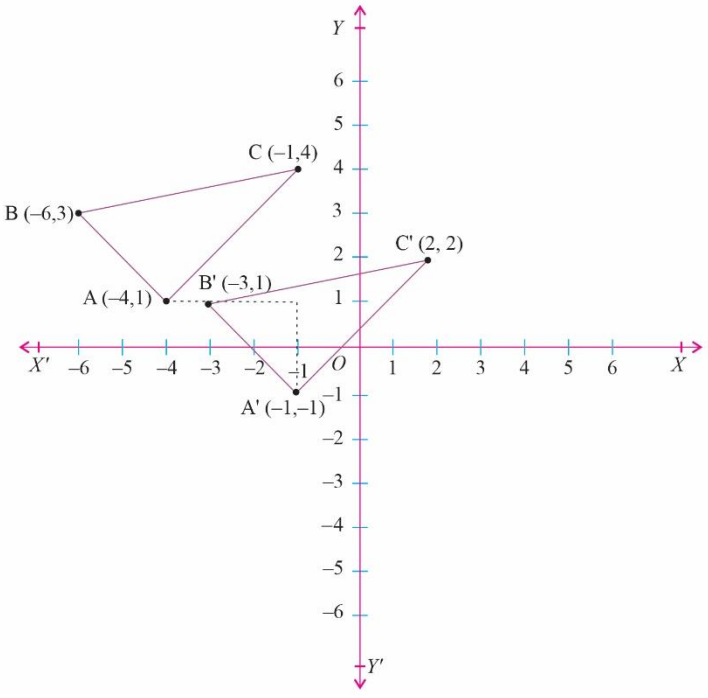
Note: For better understanding you can draw it on the graph paper or square grid.



2. Translate the following 3 units right and 2 units down.

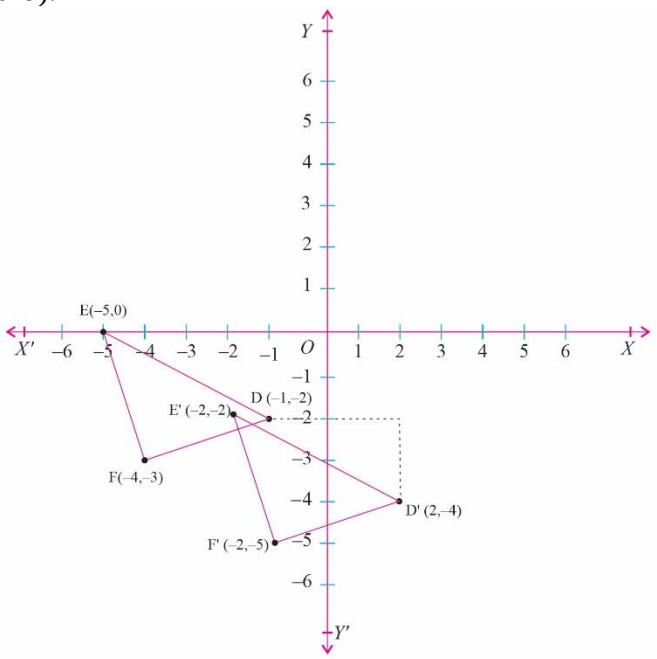
(i) ΔABC, A(−4, 1) B(−6, 3) C(−1, 4)

Solution: First of all, locate all points A, B and C on the squared paper to make ΔABC. Now, translate the obtained triangle 3 units right (means 3 boxes towards right) and 2 units down (means 2 boxes downward).



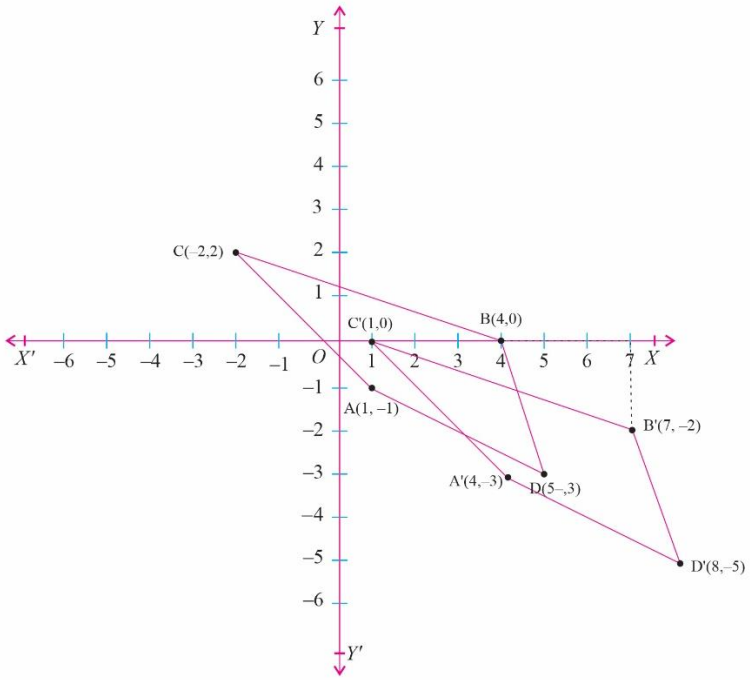
(i) ΔDEF, D(−1,−2), E(−5, 0), F(−4,−3)

Solution: First of all, locate all points D, E and F on the squared paper to make ΔDEF. Now, translate the obtained triangle 3 units right (means 3 boxes towards right) and 2 units down (means 2 boxes downward).



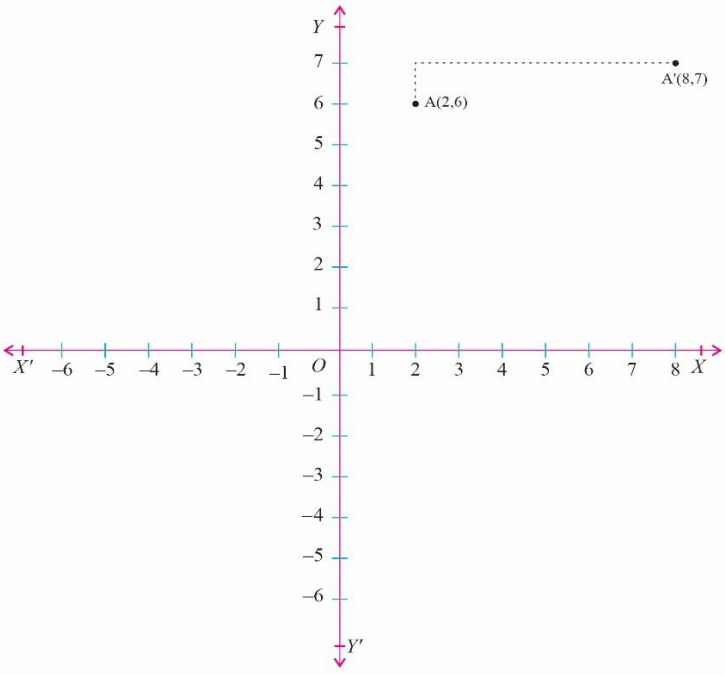
(ii) Quadrilateral ABCD, A(1,−1), B(4, 0), C(−2, 2) and D(5,−3)

Solution: First of all locate all points A, B, C and D on the squared paper to make quadrilateral ABCD. Now, translate the obtained quadrilateral 3 units right (means 3 boxes towards right) and 2 units down (means 2 boxes downward).



3. What translation is mapped point A(2, 6) onto A'(8,7)?

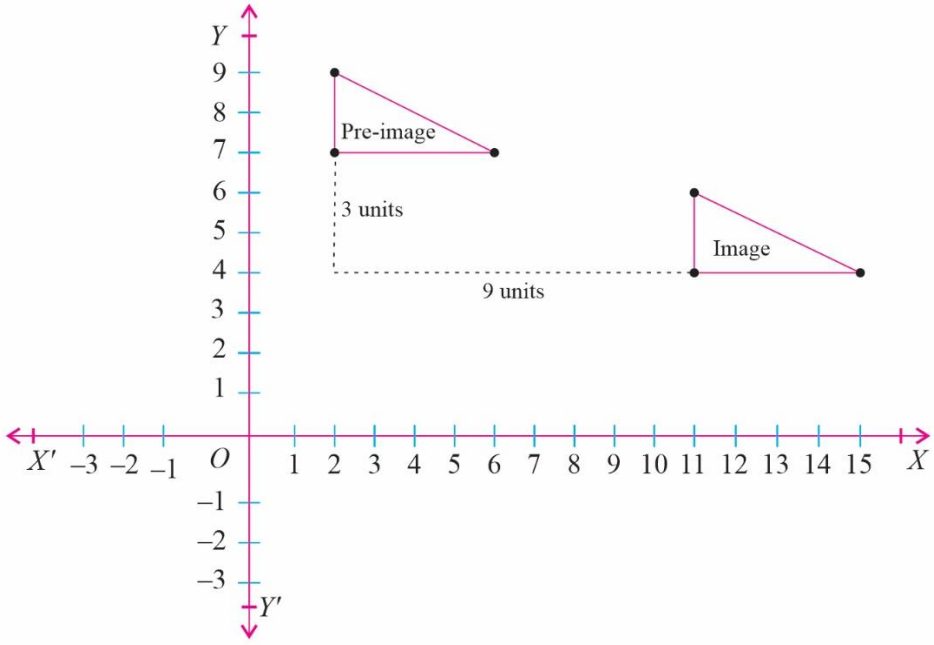
Solution: First of all, locate both point A(2, 6) and its image A'(8, 7) on the grid (squared paper). Now draw a straight line upward and right side from point A to A'.



If we see the figure, point A moves 1 point upward and 6 points towards right.

4. A triangle has coordinates (2, 7), (2, 9) and (6, 7) and its image has coordinates (11, 4), (11, 6) and (15, 4). Find the translation.

Solution: First of all locate the points of triangle and its image on the squared paper.



If we see the figure, the triangle moves 3 points downward and 9 points towards right.

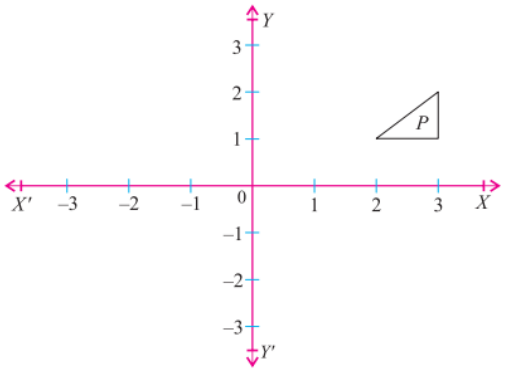
5. Find the image of triangle P for the given translation.

(i) 2 units downward

(ii) 5 units left

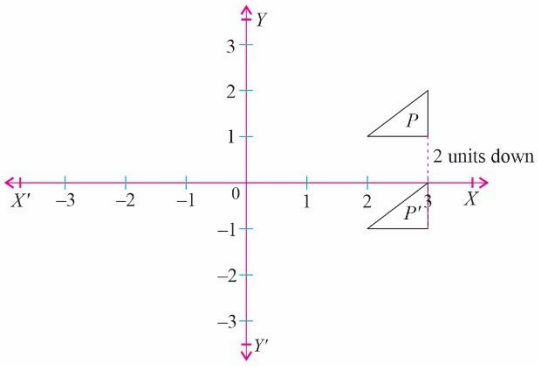
(iii) 2 units left and 1 unit upward

(iv) 4 units left and 3 units downward

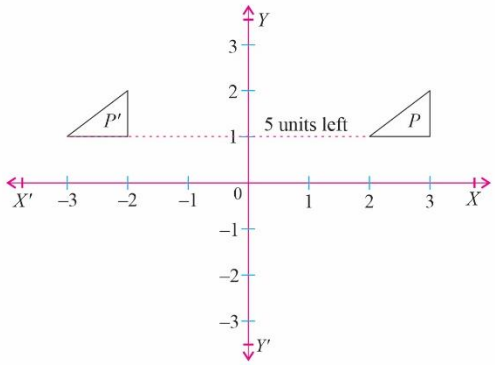


Solution: To find the image according to given conditions we translate it separately.

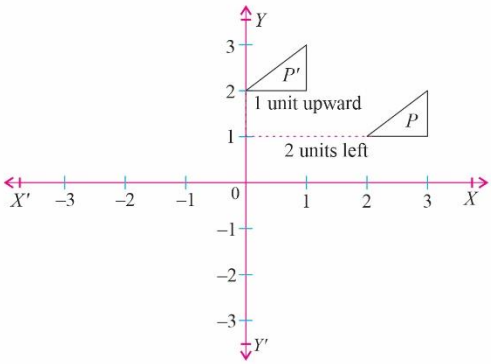
(i) 2 units downward



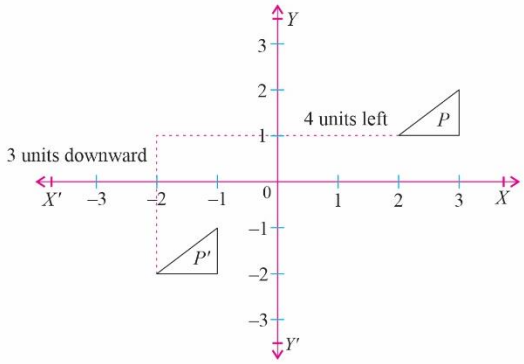
(ii) 5 units left



(iii) 2 units left and 1 unit upward



(iv) 4 units left and 3 units downward



Review Exercise 14

1. Choose the correct option.

(i) A line of symmetry divides the figure into ---------- equally.

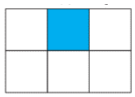
(a) one (b) two (c) three (d) four

(ii) How many lines of symmetry does the figure on right have?

(a) one (b) two (c) three (d) four

(iii) What is the order of rotational symmetry of the figure on the right?

(a) 1 (b) 2 (c) 3 (d) don't have



(iv) By drawing lines of symmetry of polygons, we can find:

(a) Image (b) area (c) translation (d) center of rotation

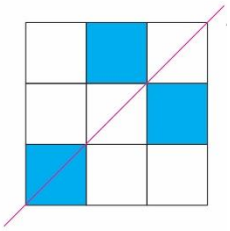
(v) In --------- an object is moved along straight line.

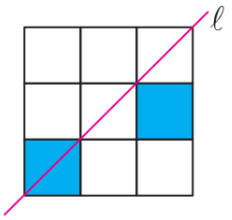
(a) rotational symmetry (b) translation

(c) perimeter (d) geometry

2. Shade a square so that the diagram has the given line of symmetry.

Solution: A line which divides the shape into two halves is called line of symmetry. So



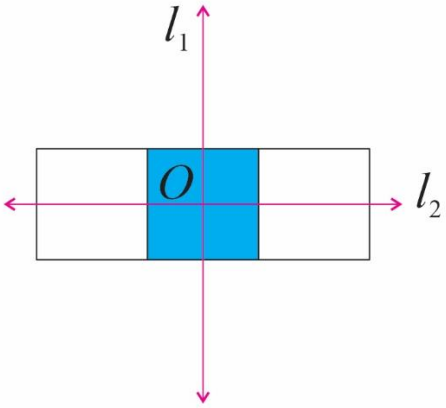


3. (i) How many lines of symmetry does the figure on the right have?

(ii) What is the order of rotational symmetry?

Solution:

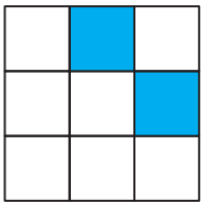
(i) There are two lines of symmetry for the given figure which are shown below.



(ii) The order of rotational symmetry for the given figure is 2.

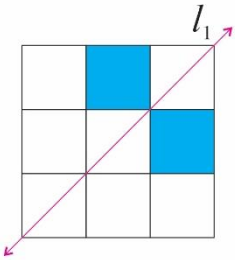
4. (i) Draw one line of symmetry in the diagram on the right.

(ii) How many squares will be shaded to get a rotational symmetry of order 4?

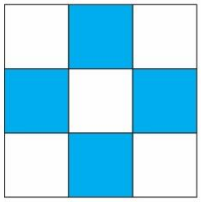


Solution: To draw line of symmetry, draw a line which divide the given shape Into two equal parts.

(i)

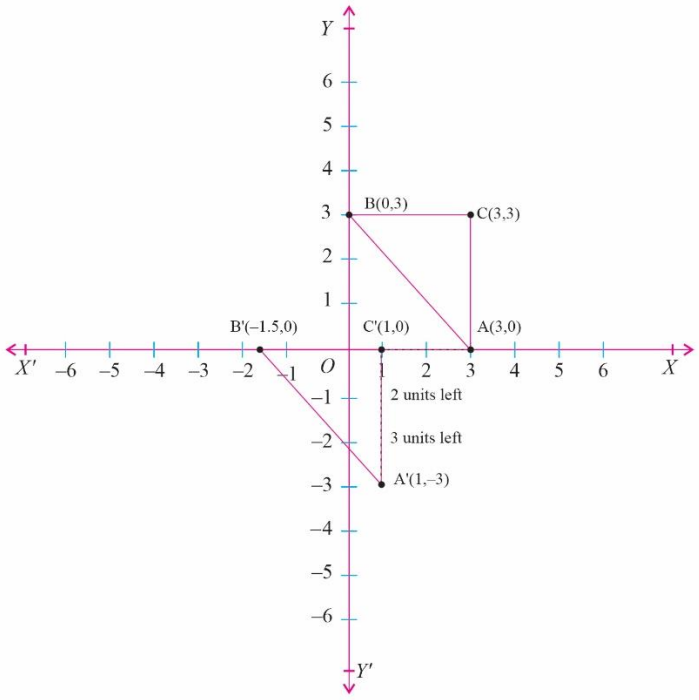


(ii)



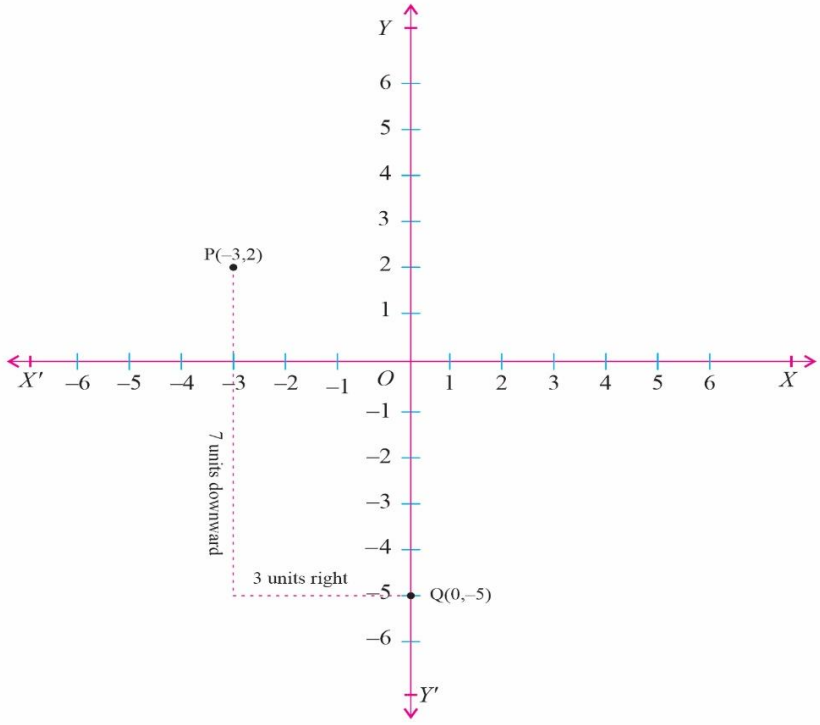
5. Translate a triangle A(3,0),B(0,3) and C(3,3) to 2 units left and 3 units down.

Solution: First of all locate all the points on the grid to make a triangle.



6. Find a translation when a point P(-3, 2) is mapped onto Q(0,-5).

Solution: First of all locate both points on the grid.

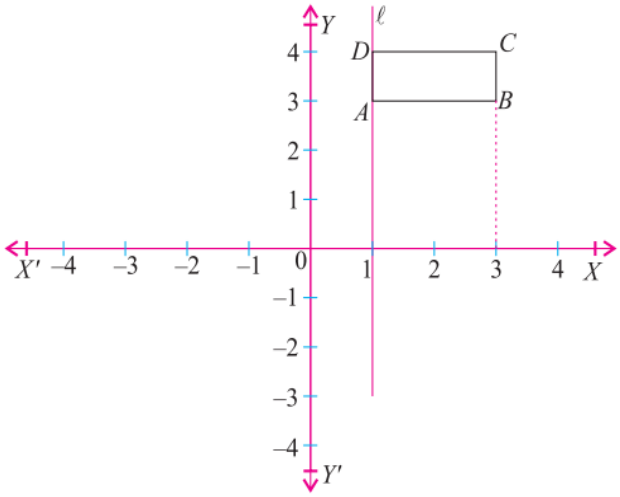


If we see the figure, the point moves 7 points downward and 3 points towards right.

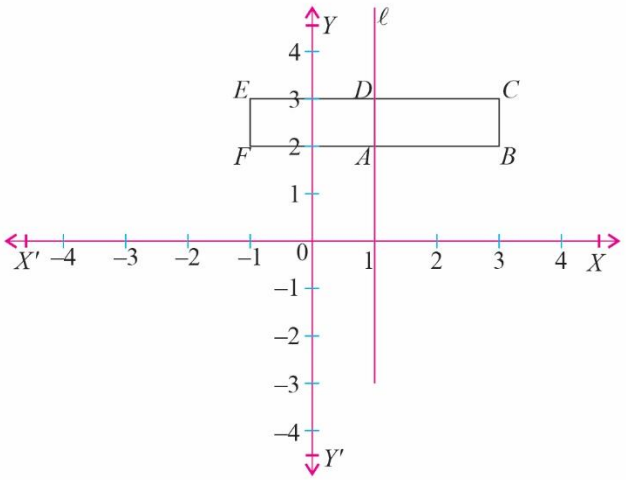
7. The coordinate of rectangle ABCD are A(1,2), B(3,2),C(3,3) and D(1,3).

(a) Complete the diagram under the line of symmetry "*l*".

(b) Translate rectangle ABCD 4 units left and 3 units down.



Solution: (a)



(b)