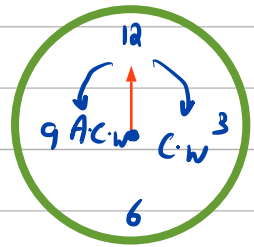


## Rotation

Defined by:



- ① Centre of Rotation
- ② Angle:  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$
- ③ Direction: Clockwise or Anticlockwise

Note: Centre of rotation is the invariant point.

In Rotation, the size & shape remains the same.

- $90^\circ$  C.W /  $270^\circ$  A.C.W
- $180^\circ$
- $90^\circ$  A.C.W /  $270^\circ$  C.W

Level 1: Centre of Rotation is origin & object is in line with the centre

Level 2: " " " " " & object is not in line with the centre

Level 3: Centre of Rotation is NOT the origin

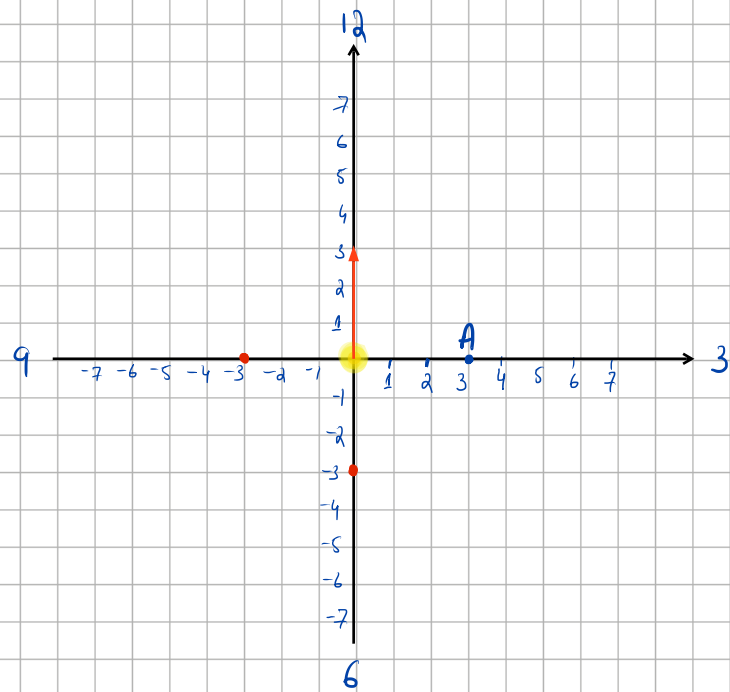
Level 4: Rotating entire shapes

## Level 1

### Example 1

Rotate the point  $A(3,0)$  about origin

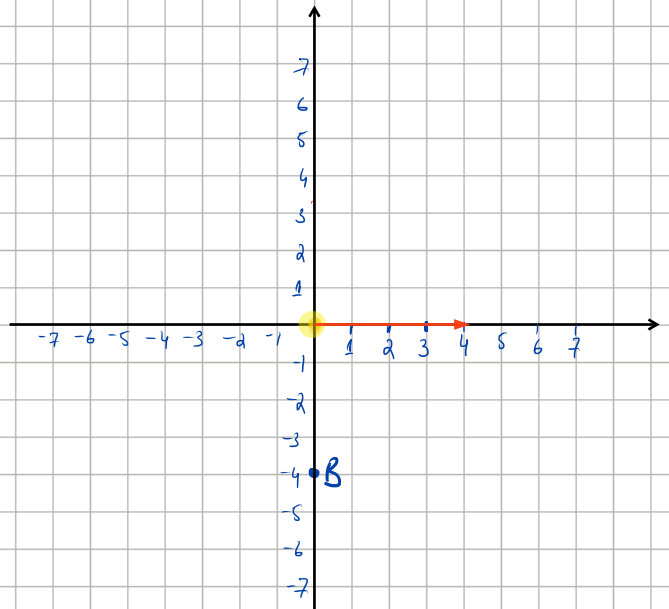
- (i)  $90^\circ$  Clockwise  $(0,-3)$
- (ii)  $180^\circ$   $(-3,0)$
- (iii)  $90^\circ$  Anti-clockwise  $(0,3)$



### Example 2

Rotate the point  $B(0,-4)$  about origin

- (i)  $90^\circ$  C.W  $(-4,0)$
- (ii)  $180^\circ$   $(0,4)$
- (iii)  $90^\circ$  A.C.W  $(4,0)$



## Level 2

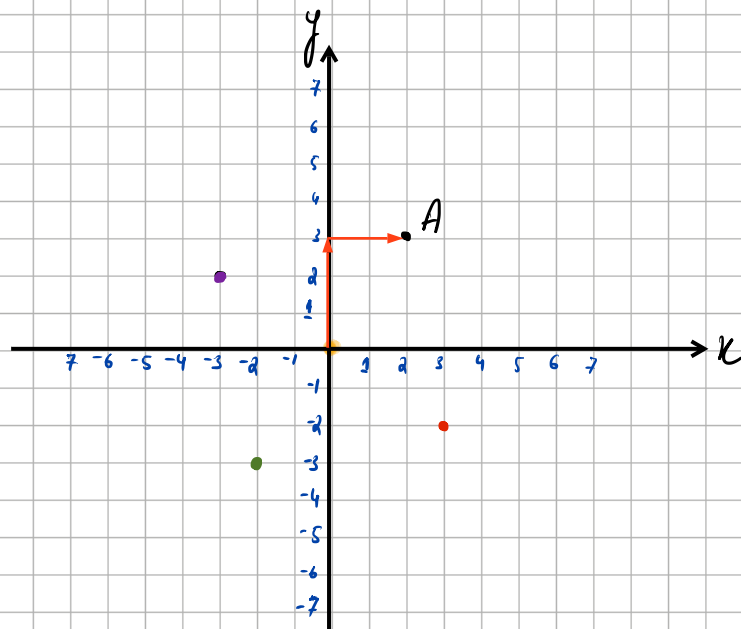
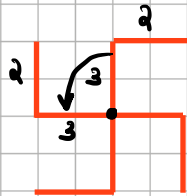
### Example 1

Rotate the point  $A(2, 3)$  about origin

i)  $90^\circ$  Clockwise  $(3, -2)$

ii)  $180^\circ$   $(-2, -3)$

iii)  $90^\circ$  Anti-clockwise  $(-3, 2)$



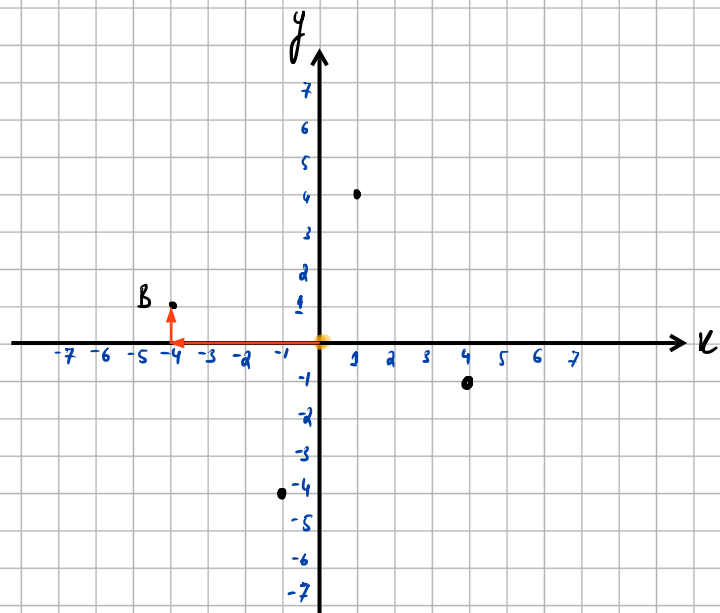
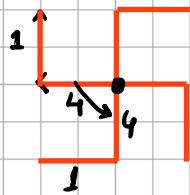
### Example 2

Rotate the point  $B(-4, 1)$  about origin

i)  $90^\circ$  Clockwise  $(1, 4)$

ii)  $180^\circ$   $(4, -1)$

iii)  $90^\circ$  Anti-clockwise  $(-1, -4)$



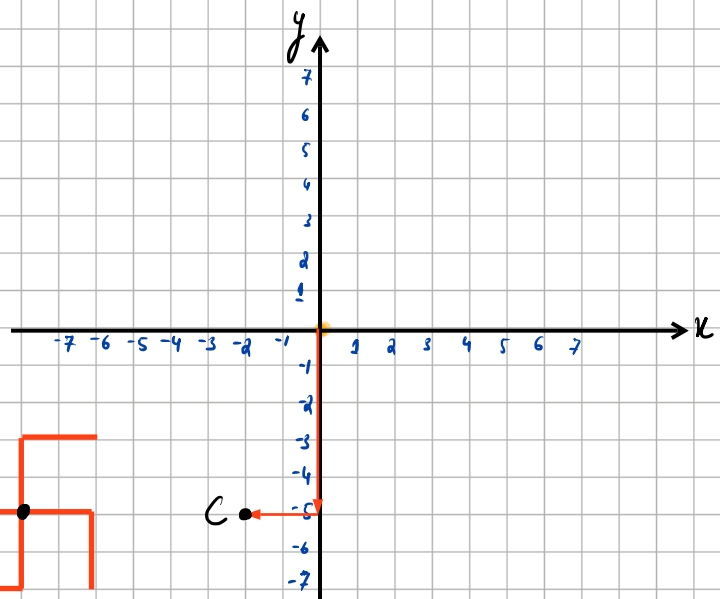
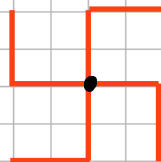
### Example 3

Rotate the point  $C(-2, -5)$  about origin

i)  $90^\circ$  Clockwise  $(-5, 2)$

ii)  $180^\circ$   $(2, 5)$

iii)  $90^\circ$  Anti-clockwise  $(5, -2)$



### Level 3

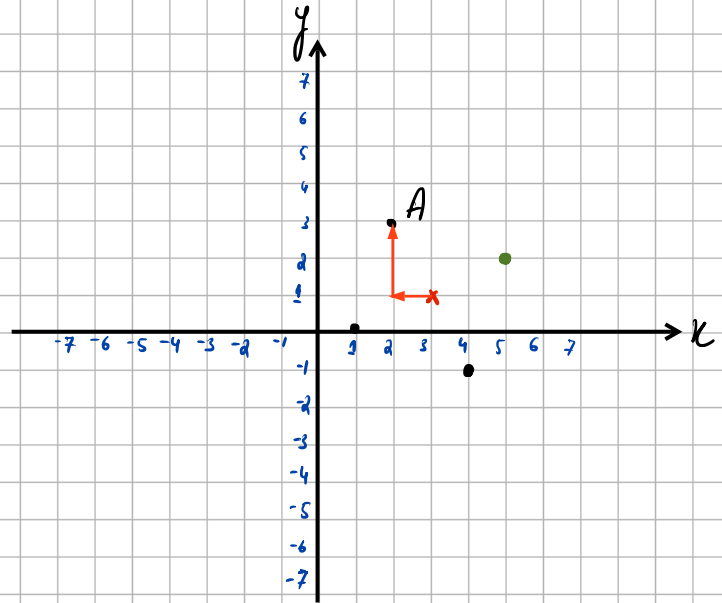
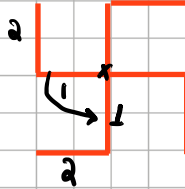
#### Example 1

Rotate the point  $A(2,3)$  about  $X(3,1)$

i)  $90^\circ$  Clockwise  $(5,2)$

ii)  $180^\circ$   $(4,-1)$

iii)  $90^\circ$  Anti-clockwise  $(1,0)$



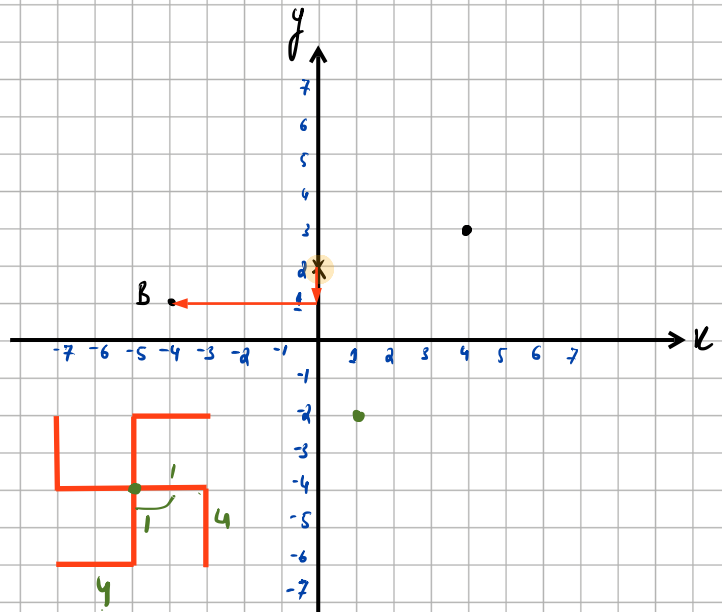
#### Example 2

Rotate the point  $B(-4,1)$  about  $X(0,2)$

i)  $90^\circ$  Clockwise  $(-1,6)$

ii)  $180^\circ$   $(4,3)$

iii)  $90^\circ$  Anti-clockwise  $(1,-2)$



## Rotation (Level 4)

Q. Rotate  $\triangle PQR$  about the centre  $X(2,3)$

(a)  $180^\circ$

(b)  $90^\circ$  clockwise.

