1. State the co-ordinates of the images of the following points under reflection in the x-axis:
(i) (3,-9)
Solution:-
The co-ordinates of the images of the given points under reflection in the x-axis is (3, 9)

(ii) (-7, 5)
Solution:-
The co-ordinates of the images of the given points under reflection in the x-axis is (-7, 5)

(iii) (0, 6)
Solution:-
The co-ordinates of the images of the given points under reflection in the x-axis is (0, 6)

(iv) (-4,-8)
Solution:-
The co-ordinates of the images of the given points under reflection in the x-axis is (-4, 8)

2. State the co-ordinates of the images of the following points under reflection in the y-axis:
(i) (2, 8)
Solution:-
The co-ordinates of the images of the given points under reflection in the y-axis is (-2, 8)

(ii) (-1,-3)
Solution:-
The co-ordinates of the images of the given points under reflection in the y-axis is (1, -3)

(iii) (5,-6)
Solution:-
The co-ordinates of the images of the given points under reflection in the y-axis is (-5, -6)

(iv) (-4, 7)
Solution:-
The co-ordinates of the images of the given points under reflection in the y-axis is (4, 7)

3. State the co-ordinates of the images of the following points under reflection in the origin:
(i) (-1,-4)
Solution:-
The co-ordinates of the images of the given points under reflection in the origin is (1, 4)

(ii) (2, 7)
Solution:-
The co-ordinates of the images of the given points under reflection in the origin is (-2, -7)

(iii) (0, 2)
Solution:-
The co-ordinates of the images of the given points under reflection in the origin is (0, -2)

(iv) (9,-9)
Solution:-
The co-ordinates of the images of the given points under reflection in the origin is (-9, 9)

4. P' is the image of P under reflection in the x-axis. If the co-ordinates of P' are (2, 10), write the co-ordinates of P.
Solution:-
From the question it is given that, P’ = (2, 10)
Then, the co-ordinates of P under reflection in the x-axis is (2, -10)

5. S' is the image of S under reflection in the origin. If the co-ordinates of S are (2,-5), write the co-ordinates of S'.
Solution:-
From the question it is given that, S = (2, -5)
Then, the co-ordinates of S’ under reflection in the origin is (-2, 5)

6. A point P is reflected in the x-axis to P'. P' is then reflected in the origin to P". If the co-ordinates of P' are (-3, 4). Find the co-ordinates of P and P". Write the single transformation that map P onto P".
Solution:-
From the question it is given that,
P’ = (-3, 4)

Then, the co-ordinates of P under reflection in the x-axis is (-3, -4)
Also the co-ordinates of P" under reflection in the origin is (3, -4)
The single transformation = reflection in the y-axis.

7. A point P is reflected in the x-axis. Co-ordinates of its image are (8, -6). Find the co-ordinates of P. Find the co-ordinates of the image of P under reflection in the y-axis.
Solution:-
From the question it is given that,
P' = (8, -6)
Then, the co-ordinates of P under reflection in the x -axis is (8, 6)
The co-ordinates of P" under reflection in the y - axis is (-8, 6)

8. A point R (3, -2) is reflected in the origin as R'. Point Q (-7, 1) is reflected in the x-axis as Q'. Write down the co-ordinates of R' and Q'. Calculate the distance R' Q'.
Solution:-
From the question it is given that
A point R = (3, -2)
Then, a point R is reflected in the origin as R' = (-3, 2)
Point Q = (-7, 1)
Then, a point Q is reflected in the x – axis as Q' = (-7, -1)
Now, we have to calculate the distance between R' Q' = $\sqrt{[(-7 – (-3))^2 + (-1 - 2)^2]}$
$= \sqrt{[(-4)^2 + (-3)^2]}$
$= \sqrt{[16 + 9]}$
$= \sqrt{25}$
= 5 units

9. The points B and C have the co-ordinates (3, 2) and (0, 3). Find B', the image of B under the reflection in the x-axis and C', the image of C under the reflection in the line BB'.
Solution:-
From the question it is given that,
Point B = (3, 2)
Point C = (0, 3)
Then, the reflection of B in the x – axis is B' = (3, -2)
And the reflection of C in the line BB' is C' = (6, 3)

10. A point P is mapped onto P' under the reflection in the x-axis. P' is mapped onto P"

under the reflection in the origin. If the co-ordinates of P" are (5,-2), write down the co-ordinates of P. State the single transformation that takes place.

Solution:-

From the question it is given that,

P” = (5, -2)

Then, co-ordinates of P’ = (-5, 2)

Therefore, the co-ordinates of P = (-5, -2)

Single transformation = reflection in the y-axis

11. Write down the co-ordinates of the image of the point (-2, 4) under reflection in the origin and under reflection in the y-axis. What is the distance between the points of reflection?

Solution:-

Let us assume that S be the Point,

So, S = (-2, 4)

Then, image under reflection in the origin S’ = (2, -4)

And image under reflection in the y-axis S” = (2, 4)

Now, the distance between point of reflection = $\sqrt{[(4 – (-4))^2 + (2 - 2)^2]}$

$= \sqrt{[(8)^2 + (0)^2]}$

$= \sqrt{64}$

= 8 units

12. A triangle ABC lies in the co – ordinate plane. The co – ordinates of its vertices are A (2, 3), B (4, -4) and C (6, -7). This triangle is reflected in the line y = 0 on to ΔA’B’C’. ΔA’B’C’ in then reflected in the origin onto ΔA”B”C”. Write down the co-ordinates of ΔA’B’C’ and ΔA”B”C”.

Solution:-

From the question it is given that,

The co – ordinates of its vertices are A (2, 3), B (4, -4) and C (6, -7)

Then, co-ordinates of ΔA’B’C’ under reflection in the line y = 0.

So, A’ = (2, -3)

B’ = (4, 4)

C’ = (6, 7)

Now, co-ordinates of ΔA”B”C” under reflection in the origin,

A” = (-2, 3)

B” = (-4, -4)

C” = (-6, -7)

13. A point P (-8, 1) is reflected in the x-axis to the point P'. The point P' is then reflected in the origin to point P". Write down the co-ordinates of P". State the single transformation that maps P into P".

Solution:-

From the question it is given that, P = (-8, 1)

The co-ordinates of P’ under reflection in the x –axis = (-8, -1)

Then, the co-ordinates of p” under reflection in the origin = (8, 1)

Single transformation = reflection in the y-axis

14. Perform the following operations and state the single transformation that takes place in each.

(i) $M_x.M_y$ on P (2, -5)

Solution:-

$M_x.M_y$ (2, -5)

M_x (-2, -5)

Therefore, reflection in the origin is (-2, 5)

(ii) $M_y.M_o$ on A (-7, 3)

Solution:-

$M_y.M_o$ (-7, 3)

M_y (7, -3)

Therefore, reflection in the x- axis is (-7, -3)

(iii) $M_o.M_y$ on B (4, 6)

Solution:-

$M_o.M_y$ (4, 6)

M_o (-4, 6)

Therefore, reflection in the x - axis (4, -6)

(iv) $M_x.M_o$ on P (-1, -3)

Solution:-

$M_x.M_o$ (-1, -3)

M_x (-1, 3)

Therefore, reflection in the y - axis (-1, -3)

15. Find the co – ordinates of the image of A(-5, 4) after reflection in the line.

(i) y = 0

Solution:-

Co – ordinates of the image = (-5, (2 × 0) - 4)

= (-5, (0 - 4))

= (-5, -4)

(i) y = 4

Solution:-

Co – ordinates of the image = (-5, (2 × 4) - 4)

= (-5, (8 - 4))

= (-5, 4)