ACTIVITY

Coordinate Geometry

Objective

To obtain the mirror image of a given geometrical figure with respect to x-axis and y-axis.

Material Required

Graph paper, pencil (colored), eraser, ruler, and mirror.

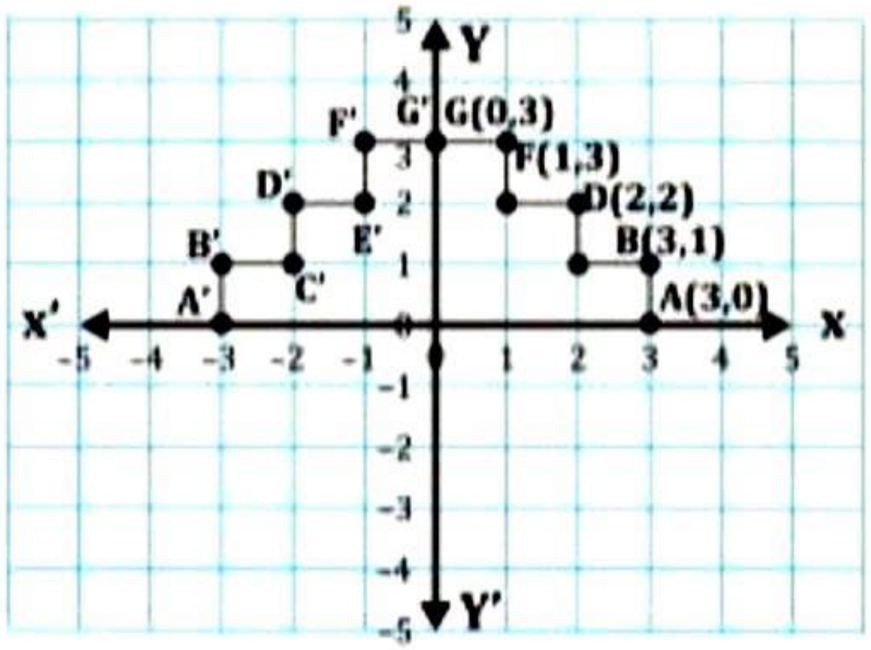
Theory

1. Plotting the points on the graph paper.
2. Cartesian system.
3. The perpendicular distance between the mirror and the image of point P is equal to the perpendicular distance between point P and the mirror.

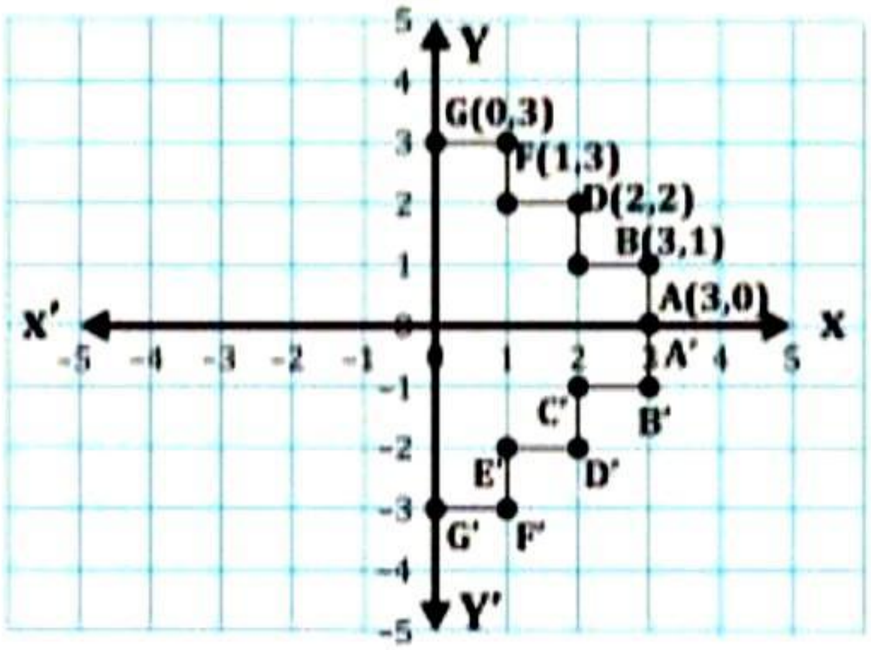
Procedure

1. Draw any figure on the graph paper in the first quadrant (say, a figure of stairs).
2. For stairs, plot some points say, A (3,0), B (3,1), C (2,1), D (2,2), E (1,2), F (1,3), G (0,3) with colored pencils.
3. join A, B, C, D, E, F, G as shown.
4. Consider y-axis as a mirror.
5. Fold the graph along the y-axis to get the images of points A, B, C, D, E, F, G in the second quadrant as A', B', C', D', E', F', G' respectively.
6. Join A', B', C', D', E', F', G' we get the image of the stairs.
7. Note down the coordinates of the image so formed and record them in observation Table 1.
8. Repeat the procedure for the same stairs with respect to the x-axis i.e., to get the image of the stairs taking the x-axis as a mirror.
9. Now, we will get the image in the fourth quadrant.
10. Note down the coordinates of the image along the x-axis and record in Table 2.

Mirror Image W.R.T. *y*-Axis



Mirror Image W.R.T. *x*-Axis



Observation and Calculation

Table 1 (Image along y-axis)

S. No.	Coordinates of Fig. ABCDEFG	Coordinates of image A′B′C′D′E′F′G′
1.	A(3,0)	A′(−3,0)
2.	B(3,1)	B′(−3,1)
3.	C(2,1)	C′(−2,1)
4.	D(2,2)	D′(−2,2)
5.	E(1,2)	E′(−1,2)
6.	F(1,3)	F′(−1,3)
7.	G(0,3)	G′(0,3)

Table 2 (Image along x-axis)

S. No.	Coordinates of Fig. ABCDEFG	Coordinates of image A′ B′ C′ D′ E′ F′ G′
1.	A(3,0)	A′(3,0)
2.	B(3,1)	B′(3,−1)
3.	C(2,1)	C′(2,−1)
4.	D(2,2)	D′(2,−2)
5.	E(1,2)	E′(1,−2)
6.	F(1,3)	F′(1,−3)
7.	G(0,3)	G′(0,−3)

Result

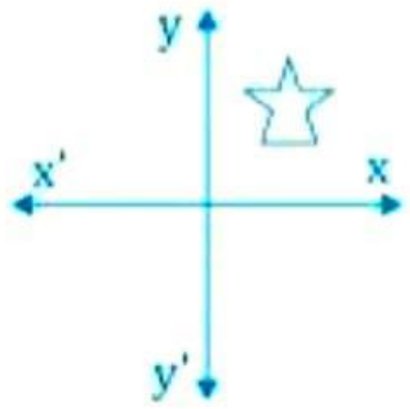
We have obtained the mirror images of figures along the x-axis and y-axis.

Learning Outcome

1. **Mirror image with respect to x-axis:** In this case, the image of P (x, y) becomes P (x, −y). Thus, to find the image of any point along the x-axis, we keep the x-co-ordinate same, and a sign of y-coordinate gets changed.Any point on the mirror remains the same.
2. **Mirror image with respect to y-axis:** In this case, the image of P (x, y) becomes P (−x, y). Thus, to find the image of any point with respect to y-axis, we keep the y-coordinate same, and the sign of the x-coordinate gets changed.

Activity Time

1. The same activity can be performed for other figures like quadrilaterals, triangles, stars, or any polygon.
2. Draw the mirror image of the figure shown, in the second quadrant by plotting different corner points of the figure.



Viva Voce

Q1. What is the angle sum property of a quadrilateral?

Ans: The sum of all angles of a quadrilateral is a complete angle, i.e., 360°

Q2. The sum of three angles of a quadrilateral is 280°. Find the measure of the fourth angle.

Ans: Fourth angle = 360° − 280° = 80°

Q3. How many vertices a quadrilateral has?

Ans: A quadrilateral has 4 vertices.

Q4. In which quadrilateral(s), diagonals are perpendicular to each other?

Ans: Rhombus.

Q5. Is it true that the diagonals of a rhombus are equal?

Ans: No

Multiple Choice Questions

Q 1. A point P(x, y) lies in the 2nd quadrant. If the signs of x and y are interchanged then it lies in:

(a) 1st quadrant (b) 2nd quadrant (c) 3rd quadrant (d) 4th quadrant

Q 2. A point P(x, y) lies in the 4th quadrant. The signs of x and y are:

(a) (−, +) (b) (−, +) (c) (+, −) (d) (−,-)

Q 3. If $x > 0$ and $y < 0$, then the point (x, y) lies in:

(a) 1st quadrant (b) 2nd quadrant (c) 3rd quadrant (d) 4th quadrant

Q 4. Which of the following points do not lie on the line $y = 2x + 1$

(a) (1, 3) (b) (2, 5) (c) (3, 7) (d) (5, 12)

Q 5. If the coordinates of the two points are P(−2, 3) and Q(−3, 5), then (abscissa of P) - (abscissa of Q) is:

(a) - 5 (b) 1 (c) - 1 (d) - 2

Q 6. If y co-ordinate of a point is zero, then the point always lies:

(a) in first quadrant (b) in second quadrant

(c) on x-axis (d) on y - axis

Q 7. The coordinates of a point having coordinate 4 and lying on y-axis are given by:

(a) (4, 0) (b) (0, 4) (c) (1, 4) (d) (4, 2)

Q 8. The perpendicular distance of the point P(3, 4) from the y-axis is:

(a) 3 units (b) 4 units (c) 5 units (d) 7 units

Q 9. Write the abscissa and coordinate of (−5, 6) :

(a) abscissa = 6, ordinate = −5

(b) abscissa = −5, ordinate = 6

(c) abscissa = 5, ordinate = 5

(d) None of these

Q 10. In which quadrant will the point lie, if the coordinate is 7 and abscissa is −8?

(a) II (b) III (c) IV (d) I

ANSWER KEY

1. (d)	2. (c)	3. (d)	4. (d)	5. (b)	6. (c)	7. (b)	8. (a)	9. (b)	10. (a)