ICSE Class 10 Maths Selina Solutions Chapter 12: A quick overview of coordinate geometry and other key ideas, such as the origin, reflection of a point in several coordinate axes, and concerning a line, are provided in this chapter. Since Class 10 is a pivotal year in a student's life, they must have a firm grasp of the concepts taught in each chapter.

Students can benefit greatly from the ICSE Class 10 Maths Selina Solutions Chapter 12, which was developed by us to make the process simpler. After all, getting high marks in a subject like maths is beneficial. The solutions are provided in PDF format, allowing students to download them.

ICSE Class 10 Maths Selina Solutions Chapter 12 Overview

ICSE Class 10 Maths Selina Solutions Chapter 12, titled "Reflection," deals with the concept of reflecting shapes over a line or point to create mirror images. This chapter focuses on understanding how to find the reflected image of a geometric figure and the properties of these reflections, such as symmetry and congruence.

ICSE Class 10 Maths Selina Solutions Chapter 12 for this chapter provide detailed, step-by-step answers to textbook problems, helping students grasp these concepts clearly. By working through these solutions, students can improve their problem-solving skills, better understand geometric transformations, and prepare effectively for their exams.

ICSE Class 10 Maths Selina Solutions Chapter 12

Below we have provided ICSE Class 10 Maths Selina Solutions Chapter 12 –

1. Complete the following table:

	Point	Transformation	Image
(a)	**(5, -7)**	**_____**	**(-5, 7)**
(b)	**(4, 2)**	**Reflection in x-axis**	**_____**
(c)	**_____**	**Reflection in y-axis**	**(0, 6)**
(d)	**(6, -6)**	**_____**	**(-6, 6)**

(e) (4, -8) _____ (-4, -8)

Solution:

	Point	Transformation	Image
(a)	(5, -7)	Reflection in origin	(-5, 7)
(b)	(4, 2)	Reflection in x-axis	(4, -2)
(c)	(0, 6)	Reflection in y-axis	(0, 6)
(d)	(6, -6)	Reflection in origin	(-6, 6)
(e)	(4, -8)	Reflection in y-axis	(-4, -8)

2. A point P is its own image under the reflection in a line l. Describe the position of point the P with respect to the line l.

Solution:

As, the image of the point P is the same point under the reflection in the line l we can say, point P is an invariant point.

Thus, the position of point P remains unaltered.

3. State the co-ordinates of the following points under reflection in x-axis:

(i) (3, 2)

(ii) (-5, 4)

(iii) (0, 0)

Solution:

(i) (3, 2)

The co-ordinates of the given point under reflection in the x-axis are (3, -2).

(ii) (-5, 4)

The co-ordinates of the given point under reflection in the x-axis are (-5, -4).

(iii) (0, 0)

The co-ordinates of the given point under reflection in the x-axis are (0, 0).

4. State the co-ordinates of the following points under reflection in y-axis:

(i) (6, -3)

(ii) (-1, 0)

(iii) (-8, -2)

Solution

(i) (6, -3)

The co-ordinates of the given point under reflection in the y-axis are (-6, -3).

(ii) (-1, 0)

The co-ordinates of the given point under reflection in the y-axis are (1, 0).

(iii) (-8, -2)

The co-ordinates of the given point under reflection in the y-axis are (8, -2).

5. State the co-ordinates of the following points under reflection in origin:

(i) (-2, -4)

(ii) (-2, 7)

(iii) (0, 0)

Solution:

(i) (-2, -4)

The co-ordinates of the given point under reflection in origin are (2, 4).

(ii) (-2, 7)

The co-ordinates of the given point under reflection in origin are (2, -7).

(iii) (0, 0)

The co-ordinates of the given point under reflection in origin are (0, 0).

6. State the co-ordinates of the following points under reflection in the line x = 0:

(i) (-6, 4)

(ii) (0, 5)

(iii) (3, -4)

Solution:

(i) (-6, 4)

The co-ordinates of the given point under reflection in the line x = 0 are (6, 4).

(ii) (0, 5)

The co-ordinates of the given point under reflection in the line x = 0 are (0, 5).

(iii) (3, -4)

The co-ordinates of the given point under reflection in the line x = 0 are (-3, -4).

7. State the co-ordinates of the following points under reflection in the line y = 0:

(i) (-3, 0)

(ii) (8, -5)

(iii) (-1, -3)

Solution:

(i) (-3, 0)

The co-ordinate of the given point under reflection in the line y = 0 is (-3, 0).

(ii) (8, -5)

The co-ordinate of the given point under reflection in the line y = 0 is (8, 5).

(iii) (-1, -3)

The co-ordinate of the given point under reflection in the line y = 0 is (-1, 3).

8. A point P is reflected in the x-axis. Co-ordinates of its image are (-4, 5).

(i) Find the co-ordinates of P.

(ii) Find the co-ordinates of the image of P under reflection in the y-axis.

Solution:

(i) As, M_x (-4, -5) = (-4, 5)

Hence, the co-ordinates of P are (-4, -5).

(ii) Co-ordinates of the image of P under reflection in the y-axis (4, -5).

9. A point P is reflected in the origin. Co-ordinates of its image are (-2, 7).

(i) Find the co-ordinates of P.

(ii) Find the co-ordinates of the image of P under reflection in the x-axis.

Solution:

(i) As, M_O (2, -7) = (-2, 7)

Hence, the co-ordinates of P are (2, -7).

(ii) Co-ordinates of the image of P under reflection in the x-axis (2, 7)

ICSE Class 10 Maths Selina Solutions Chapter 12 Exercise 12(B)

1. Attempt this question on graph paper.

(a) Plot A (3, 2) and B (5, 4) on graph paper. Take 2 cm = 1 unit on both the axes.

(b) Reflect A and B in the x-axis to A' and B' respectively. Plot these points also on the same graph paper.

(c) Write down:

(i) the geometrical name of the figure ABB'A';

(ii) the measure of angle ABB';

(iii) the image of A" of A, when A is reflected in the origin.

(iv) the single transformation that maps A' to A".

Solution:

(c)

(i) From the graph, it's clearly seen that ABB'A' is an isosceles trapezium.

(ii) The measure of angle ABB' is 45°.

(iii) A” = (-3, -2)

(iv) Single transformation that maps A’ to A” is the reflection in y-axis.

2. Points (3, 0) and (-1, 0) are invariant points under reflection in the line L_1; points (0, -3) and (0, 1) are invariant points on reflection in line L_2.

(i) Name or write equations for the lines L_1 and L_2.

(ii) Write down the images of the points P (3, 4) and Q (-5, -2) on reflection in line L_1. Name the images as P’ and Q’ respectively.

(iii) Write down the images of P and Q on reflection in L_2. Name the images as P” and Q” respectively.

(iv) State or describe a single transformation that maps P’ onto P”.

Solution:

(i) We know that, every point in a line is invariant under the reflection in the same line.

As the points (3, 0) and (-1, 0) lie on the x-axis.

Thus, (3, 0) and (-1, 0) are invariant under reflection in x-axis.

Therefore, the equation of line L_1 is y = 0.

Similarly, (0, -3) and (0, 1) are also invariant under reflection in y-axis.

Therefore, the equation of line L_2 is x = 0.

(ii) P’ = Image of P (3, 4) in L_1 = (3, -4)

And, Q’ = Image of Q (-5, -2) in L_1 = (-5, 2)

(iii) P” = Image of P (3, 4) in L_2 = (-3, 4)

And, Q” = Image of Q (-5, -2) in L_2 = (5, -2)

(iv) Single transformation that maps P’ onto P” is reflection in origin.

3. (i) Point P (a, b) is reflected in the x-axis to P’ (5, -2). Write down the values of a and b.

(ii) P” is the image of P when reflected in the y-axis. Write down the co-ordinates of P”.

(iii) Name a single transformation that maps P’ to P”.

Solution:

(i) As, M_x (x, y) = (x, -y)

P’ (5, -2) = reflection of P (a, b) in x-axis.

Hence, the co-ordinates of P are (5, 2).

Thus, a = 5 and b = 2.

(ii) P” = image of P (5, 2) reflected in y-axis = (-5, 2)

(iii) Single transformation that maps P’ to P” is the reflection in origin.

4. The point (-2, 0) on reflection in a line is mapped to (2, 0) and the point (5, -6) on reflection in the same line is mapped to (-5, -6).

(i) State the name of the mirror line and write its equation.

(ii) State the co-ordinates of the image of (-8, -5) in the mirror line.

Solution:

(i) We know that, reflection of a point (x, y) in y-axis is (-x, y).

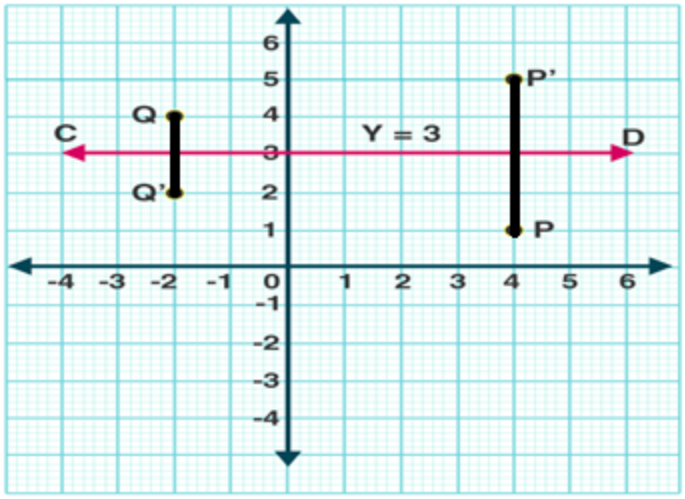
So, the point (-2, 0) when reflected in y-axis is mapped to (2, 0).

Hence, the mirror line is the y-axis and it’s equation is x = 0.

(ii) The co-ordinates of the image of (-8, -5) in the mirror line (i.e., y-axis) are (8, -5).

5. The points P (4, 1) and Q (-2, 4) are reflected in line y = 3. Find the co-ordinates of P’, the image of P and Q’, the image of Q.

Solution:



The line y = 3 is a line parallel to x-axis and at a distance of 3 units from it.

Let's mark the points P (4, 1) and Q (-2, 4).

Now from P, draw a straight line perpendicular to line CD and produce. Mark a point P' on this line which is at the same distance above CD as P is below it.

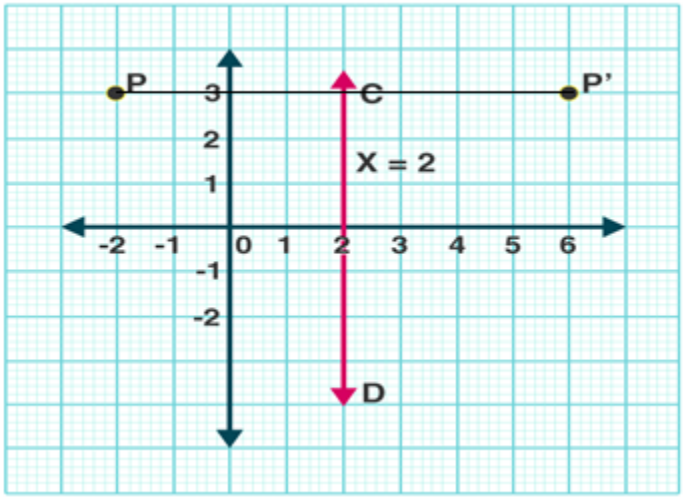
Thus, the co-ordinates of P' are (4, 5).

Similarly, from Q, draw a line perpendicular to CD and mark point Q' which is at the same distance below CD as Q is above it.

Hence, the co-ordinates of Q' are (-2, 2).

6. A point P (-2, 3) is reflected in line x = 2 to point P'. Find the coordinates of P'.

Solution:



The line x = 2 is a line parallel to y-axis and at a distance of 2 units from it.

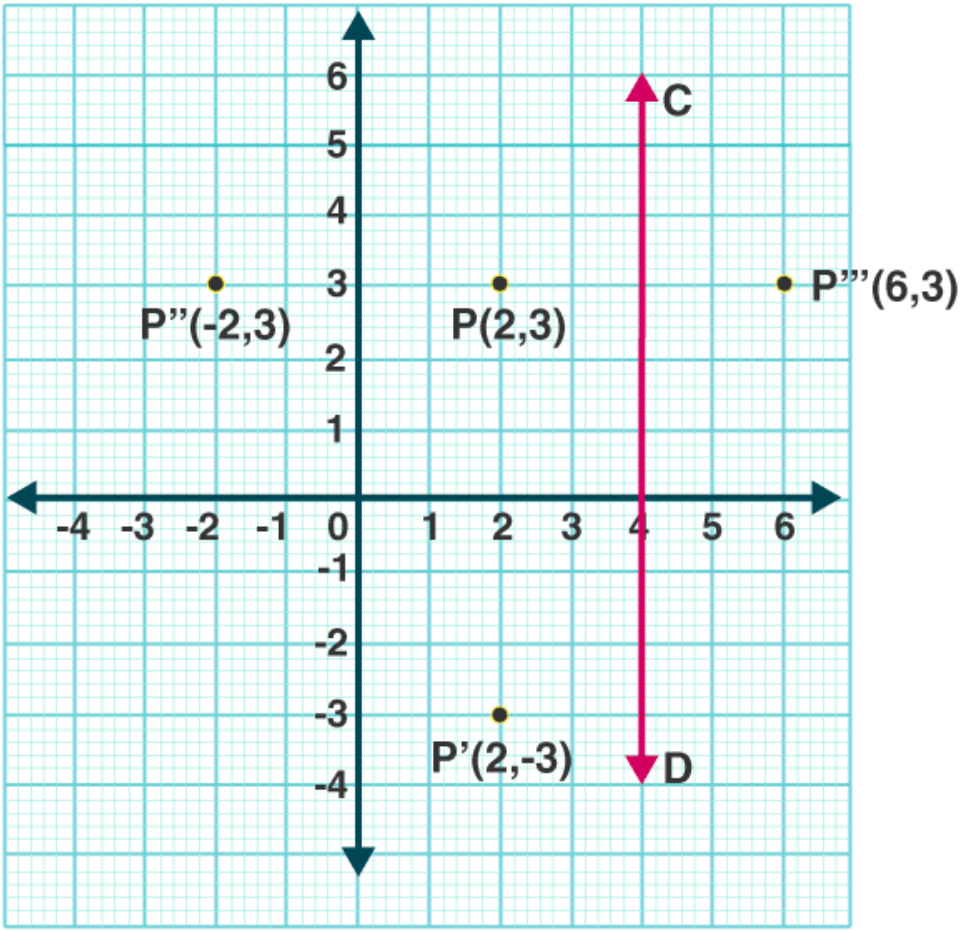
Let's mark the point P (-2, 3).

From P, draw a straight line perpendicular to line CD and produce. Mark a point on this line which is at the same distance to the right of CD as P is to the left of it.

Hence, the co-ordinates of P' are (6, 3).

7. A point P (a, b) is reflected in the x-axis to P' (2, -3). Write down the values of a and b. P" is the image of P, reflected in the y-axis. Write down the co-ordinates of P". Find the co-ordinates of P"', when P is reflected in the line, parallel to y-axis, such that x = 4.

Solution:



A point P (a, b) is reflected in the x-axis to P' (2, -3).

We know that, M_x (x, y) = (x, -y)

Hence, the co-ordinates of P are (2, 3).

And thus, a = 2 and b = 3.

P” = Image of P reflected in the y-axis = (-2, 3)

P”’ = Reflection of P in the line (x = 4, a line parallel to y-axis and at a distance of 4 units from it) = (6, 3)

8. Points A and B have co-ordinates (3, 4) and (0, 2) respectively. Find the image:

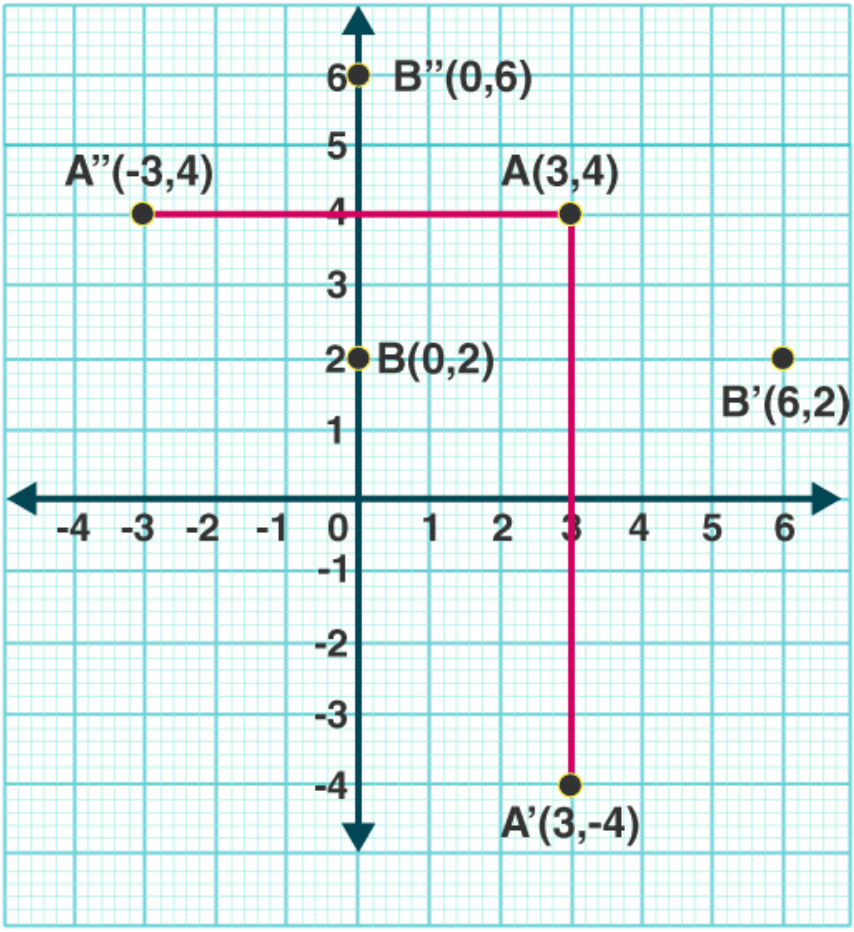
(a) A’ of A under reflection in the x-axis.

(b) B’ of B under reflection in the line AA’.

(c) A” of A under reflection in the y-axis.

(d) B” of B under reflection in the line AA”.

Solution:



(a) A’ = Image of A under reflection in the x-axis = (3, -4)

(b) B’ = Image of B under reflection in the line AA’ (x = 3) = (6, 2)

(c) A” = Image of A under reflection in the y-axis = (-3, 4)

(d) B” = Image of B under reflection in the line AA” (y = 4) = (0, 6)

Benefits of ICSE Class 10 Maths Selina Solutions Chapter 12

Chapter 12 of ICSE Class 10 Maths, titled "Reflection," typically covers the concepts of reflection in geometry, where a shape is mirrored over a line or point. Selina Solutions, which provide step-by-step answers to textbook problems, can offer several benefits to students studying this chapter. Here are some key advantages:

1. **Clear Understanding of Concepts**

Detailed Solutions: Selina Solutions break down each problem into manageable steps, helping students understand the process of reflecting shapes over lines or points.

Visual Aids: Problems often include diagrams which make abstract concepts like symmetry and congruence more tangible.

2. **Improved Problem-Solving Skills**

Practice Problems: Access to a variety of problems with solutions helps students practice and reinforce their understanding of reflection.

Step-by-Step Guidance: Detailed solutions demonstrate methods and strategies to solve similar problems independently.

3. **Enhanced Learning and Retention**

Reinforcement of Key Ideas: Repeated exposure to reflection problems and their solutions helps in better retention of concepts.

Error Correction: Reviewing solutions can help students identify and learn from mistakes, improving their problem-solving skills.

4. **Efficient Study Tool**

Quick Reference: Selina Solutions serve as a quick reference to verify answers and understand the correct approach.

Time Management: They save time by providing instant feedback on solutions and methods, which is especially helpful during revision.

5. **Preparation for Exams**

Exam Pattern Familiarity: By practicing with Selina Solutions, students become familiar with the types of problems that may appear in exams.

Confidence Building: Mastery of reflection problems through practice boosts confidence and reduces exam anxiety.