PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 12 : Reflection

(Coordinate Geometry : Reflection in the x-axis, y-axis, origin and the lines x = a, y = a; Invariant Points)

Maximum Marks: 40 Time allowed: One and a half hours

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper.*
3. ***The time given at the head of this Paper is the time allowed for writing the answers.***
4. *Attempt **all** questions from **Section A** and **any two** questions from **Section B**.*
5. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
6. ***Omission of essential working will result in loss of marks.***
7. *The intended marks for questions or parts of questions are given in brackets [ ].*
8. *Notation: M_x, M_y, M_o denote reflection in the x-axis, the y-axis and the origin respectively. In $M_x \cdot M_y$, the reflection written on the right is performed first.*

Question 1

Choose the correct answers to the questions from the given options. [8]

(Do not copy the question, write the correct answers only.)

(i) The image of the point (−7, 4) under reflection in the x-axis is:

(a) (7, 4)
(b) (−7, −4)
(c) (7, −4)
(d) (−4, −7)

(ii) The image of the point (5, −3) under reflection in the line x = 2 is:

(a) (−1, −3)
(b) (9, −3)
(c) (5, 7)
(d) (−1, 3)

(iii) The image of the point (a, b) under reflection in the origin is (−6, 9). The value of a − b is:

(a) −15
(b) −3
(c) 15
(d) 3

(iv) $M_y \cdot M_x$ is equivalent to a single reflection in:

(a) the x-axis
(b) the y-axis
(c) the line y = 1
(d) the origin

(v) The image of the point (−4, 5) under reflection in the line y = −1 is:

(a) (−4, −5)
(b) (−4, −7)
(c) (−4, −6)
(d) (4, −7)

(vi) Which of the following points is invariant under reflection in the line x = 3?

(a) (0, 3)
(b) (−3, 0)
(c) (3, −5)
(d) (5, 3)

(vii) **Assertion (A):** The point (0, 6) is invariant under reflection in the y-axis.

Reason (R): Every point lying on the line of reflection is its own image.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

(viii) **Assertion (A):** For every point P, $M_x \cdot M_x$ (P) = P.

Reason (R): Under reflection in the x-axis the signs of both the abscissa and the ordinate change.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

Question 2

(i) The point A(−5, 2) is reflected in the y-axis to A′ and the point B(4, −2) is reflected in the origin to B′. Write down the co-ordinates of A′ and B′ and find the length of A′B′. [4]

(ii) A point P(a, b) is reflected in the y-axis to P′. The point P′ is then reflected in the origin to P″(−7, 3). Find the values of a and b, and name the single transformation that maps P onto P″. [4]

(iii) The point P(−4, 5) is reflected in the line x = 1 to P′, and the point Q(6, −3) is reflected in the line y = −2 to Q′. Find the co-ordinates of P′ and Q′ and the length of P′Q′. [4]

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 3

Use a graph paper for this question. Take 1 cm = 1 unit on both the axes.

(i) Plot the points A(2, 1) and B(5, 4). Write down the co-ordinates of A′ and B′, the images of A and B respectively in the y-axis, and plot them. [3]

(ii) Name the quadrilateral ABB′A′ and find its area. [3]

(iii) B″ is the image of B′ under reflection in the x-axis. Write down the co-ordinates of B″, name the single transformation that maps B onto B″, and find the area of triangle BB′B″. [4]

Question 4

The point P(−2, 4), on reflection in a line l, is mapped to P′(6, 4).

(i) Name the line l and write its equation. Give a reason for your answer. [3]

(ii) Find the image of Q(−5, −3) in the line l. Also write the co-ordinates of the point on the x-axis that is invariant under reflection in l. [3]

(iii) The point A(−3, 2) is reflected in l to A′, and A′ is then reflected in the line y = −1 to A″. Write down the co-ordinates of A′ and A″ and find the area of triangle AA′A″. [4]

Question 5

(i) Find the images of: (a) (5, −4) in the line x = −1; (b) (−3, 2) in the line y = 4; (c) the origin in the line x = 3. [3]

(ii) The point P(m, n), on reflection in the line x = 3, is mapped to P′(−1, 7). Find m and n. Hence find the image of P in the line y = 1. [3]

(iii) The point P(3, −5), on reflection in a line, is mapped to P′(3, 9). (a) Find the equation of the line of reflection. (b) Find the image of Q(−6, −1) in the same line. (c) Write the co-ordinates of the point where the line PP′ meets the line of reflection. [4]

Question 6

(i) Find $M_x \cdot M_o$ (−3, 7). Write down the single transformation equivalent to $M_x \cdot M_o$ and state whether $M_x \cdot M_o = M_o \cdot M_x$. [3]

(ii) The point P(2t − 4, t + 2) is invariant under reflection in the y-axis and the point Q(s + 5, 3s − 9) is invariant under reflection in the x-axis. Find P and Q. Also state, with a reason, the image of Q in the line x = 8. [3]

(iii) The point A(−4, 3) is reflected in the y-axis to B, in the origin to C and in the x-axis to D. Write down the co-ordinates of B, C and D. Name the quadrilateral ABCD and find its area. [4]

— End of Question Paper —