Experiment No. .....

Date .....

* Objective: To draw the graph of $\sin^{-1}x$, using the graph of $\sin x$ and demonstrate the concept of mirror reflection (about the line $y = x$)

* Prerequisite Knowledge:
Knowledge of plotting the graph of $\sin x$ and basic knowledge of inverse trigonometric functions.

* Materials Required:
Graph paper, ruler, eraser, pencil

* Procedure:
1. Take a graph paper and draw 2 perpendicular lines as x-axis and y-axis.
2. Mark the points on the positive y-axis 0.5, 1, 1.5, 2. Similarly, mark the points on the negative y-axis -0.5, -1, -1.5, -2.
3. Graduate the axes and mark approximately the points $\left(\frac{\pi}{6}, \sin\frac{\pi}{6}\right), \left(\frac{\pi}{4}, \sin\frac{\pi}{4}\right), \cdots, \left(\frac{\pi}{2}, \sin\frac{\pi}{2}\right)$ i.e., $\left(\frac{\pi}{6}, 0.5\right), \left(\frac{\pi}{4}, 0.71\right), \left(\frac{\pi}{3}, 0.87\right)$ and $\left(\frac{\pi}{2}, 1\right)$ in the coordinate plane.
4. Mark these points as N_1, N_2, N_3, N_4.

Remarks _____

Teacher's Sign. _____

* Observation

Observation Table

Points	Image of points in mirror (the line $y = x$)	Is the line joining the points perpendicular to $y = x$? (Yes / No)
N_1	I_1	Yes
N_2	I_2	Yes
N_3	I_3	Yes
N_4	I_4	Yes
N_1'	I_1'	Yes
N_2'	I_2'	Yes
N_3'	I_3'	Yes
N_4'	I_4'	Yes

The image of the graph of $\sin x$ in $y = x$ is the graph of $\underline{\sin^{-1} x}$, and the image of the graph of $\sin^{-1} x$ in $y = x$ is the graph of $\underline{\sin x}$.

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5. Repeat the above process on the negative x-axis and name them as N_1', N_2', N_3', N_4'
6. Draw a free hand curve by joining all the points to get the graph of $\sin x$ from $-\frac{\pi}{2}$ to $\frac{\pi}{2}$
7. Fold the square graph sheet along the diagonal to get the graph of line $y = x$. Using ruler, draw a line where the crease formed.
8. Draw perpendiculars from the points N_1, N_2, N_3, N_4 on the line $y = x$ and produce these lines such that the length of perpendicular on both sides of the line $y = x$ are equal. Name the points on the other side of the line as I_1, I_2, I_3, I_4.
9. Repeat the above process on the negative side of x-axis to get images I_1', I_2', I_3', I_4'
10. Join all the points I_1 to I_4 and I_1' and I_4', on both sides of the line $y = x$ to obtain the graph of $y = \sin^{-1} x$.
11. Clearly the 2 functions $\sin x$ and $\sin^{-1} x$ are the mirror images of each other.

* Conclusion:

The graph of $\sin^{-1} x$ is plotted using the graph of $\sin x$. It has been verified that the two graphs are mirror images of each other in the line $y = x$.

Teacher's Sign. _____

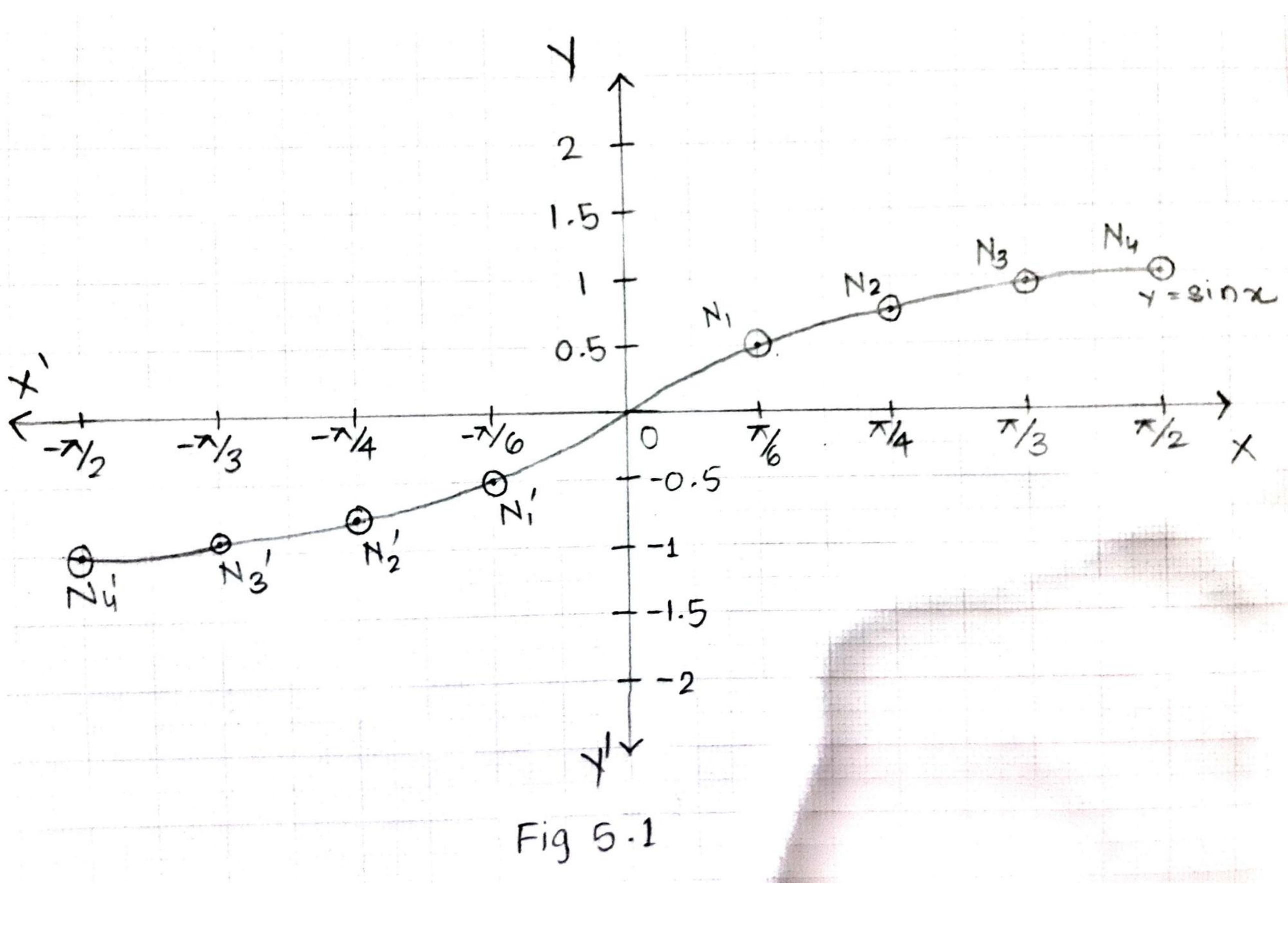

Fig 5.1

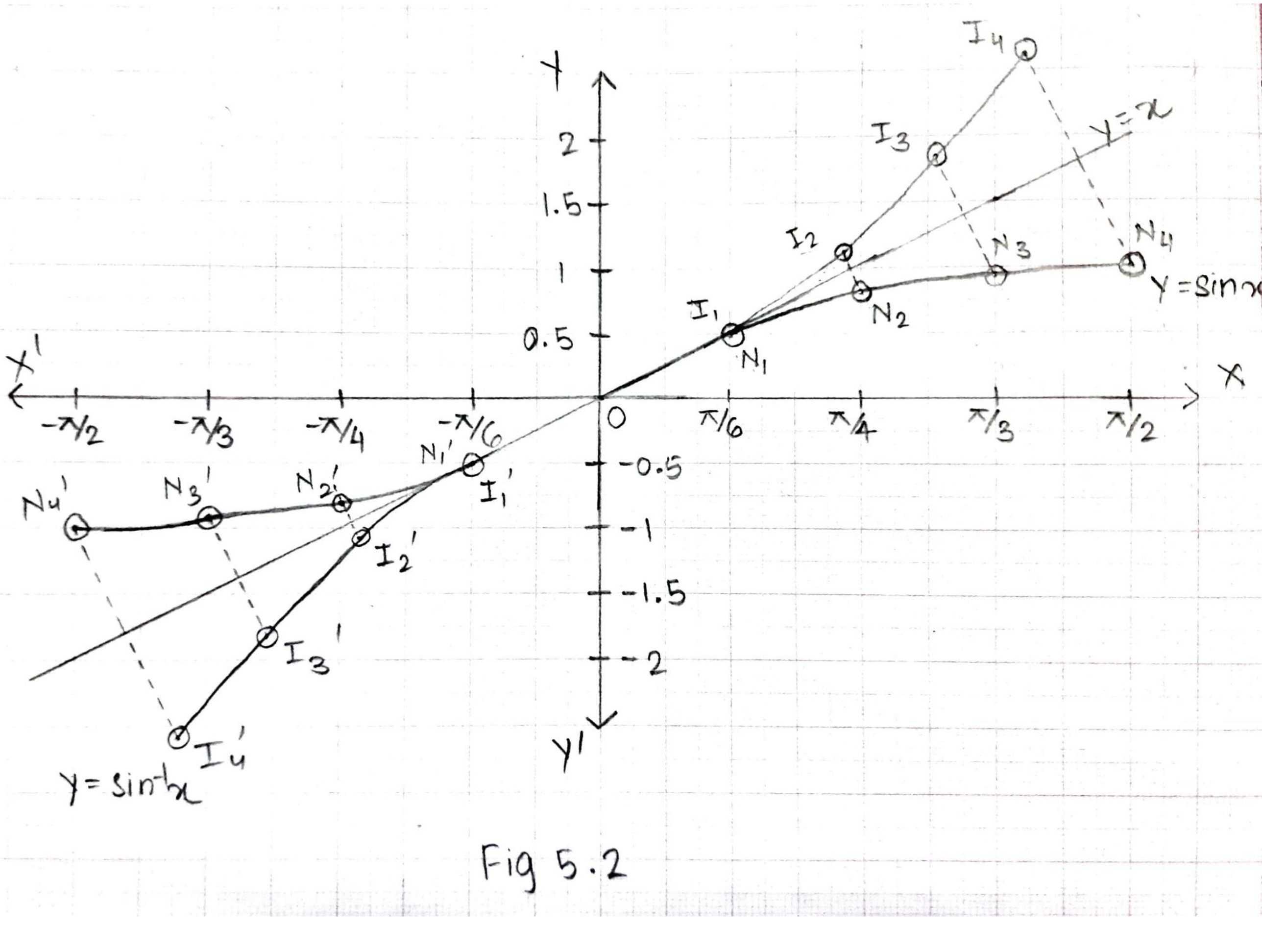

Fig 5.2