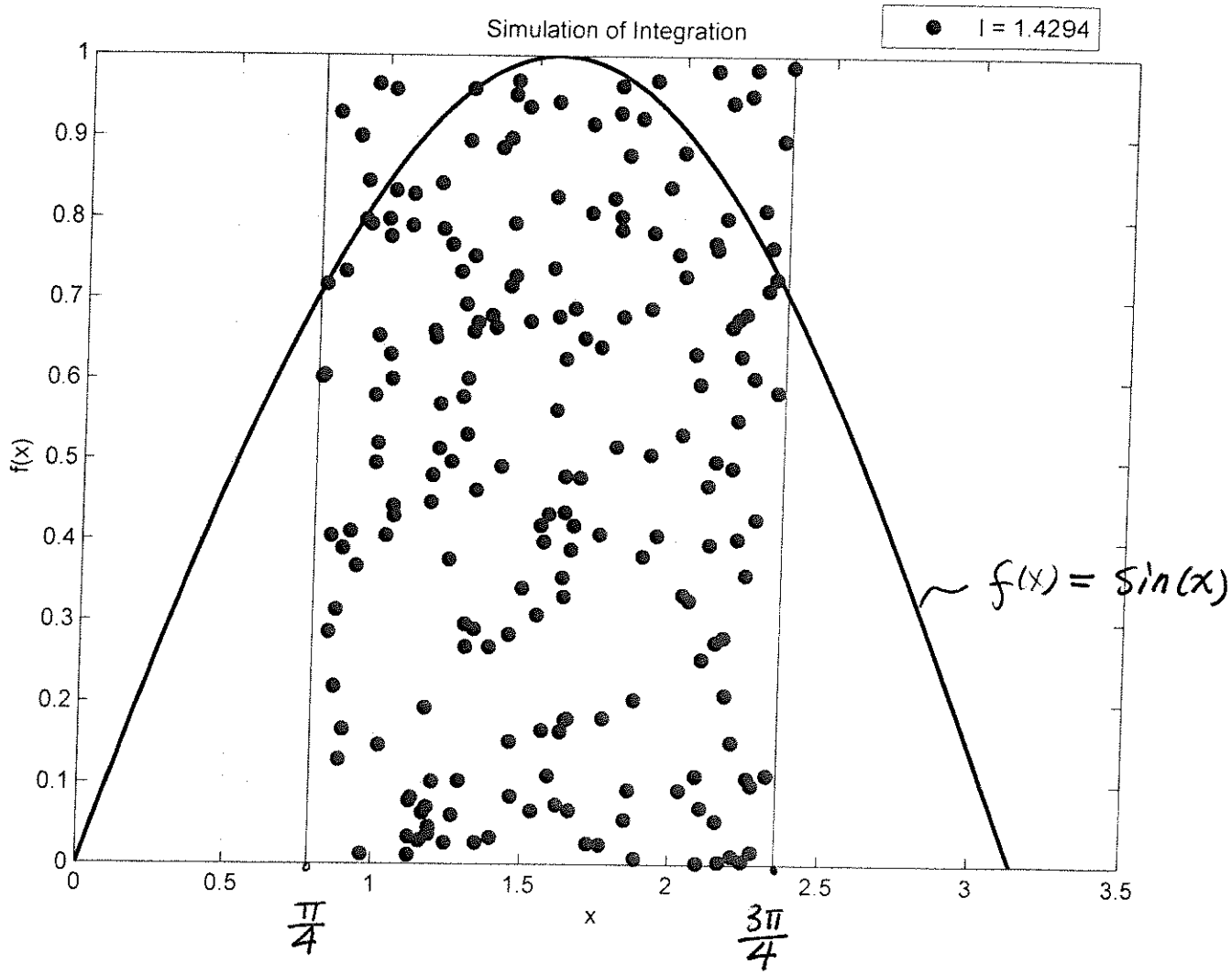
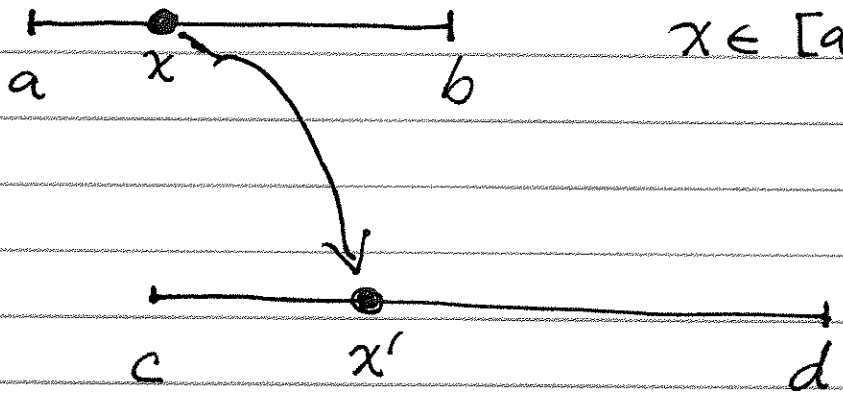
$$I = \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \sin(x)\,dx$$



Mapping of a point



$x \in [a, b]$

$x' \in [c, d]$

The relative position of point x over $[a, b]$ should be the same as that of x' over $[c, d]$.

$$\frac{x-a}{b-a} = \frac{x'-c}{d-c}$$

So, $x' = \frac{b-a}{d-c}$

$$\boxed{x' = \frac{d-c}{b-a}(x-a) + c}$$