STEP/Transformations Q1 (28/6/23)

(i) What series of transformations is equivalent to a reflection in the line $x = L$?

(ii) What is the effect of a reflection in the line $x = L$ on the function $y = f(x)$?

Solution

(i) Translation of $\begin{pmatrix} -L \\ 0 \end{pmatrix}$, followed by reflection in y-axis, followed by translation of $\begin{pmatrix} L \\ 0 \end{pmatrix}$

(ii) Translation of $\begin{pmatrix} -L \\ 0 \end{pmatrix}$: $y = f(x) \rightarrow y = f(x + L)$;

reflection in y-axis: $y = f(x + L) \rightarrow y = f(-x + L)$

translation of $\begin{pmatrix} L \\ 0 \end{pmatrix}$: $y = f(-x + L) \rightarrow y = f(-[x - L] + L)$

$= f(2L - x)$