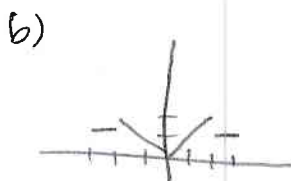


Instructions: Show all work. Give exact answers (yes, that means fractions, square roots and exponentials, and not decimals) unless specifically directed to give a decimal answer. This will require some operations to be done by hand even if not specifically directed to. Be sure to complete all parts of each question.

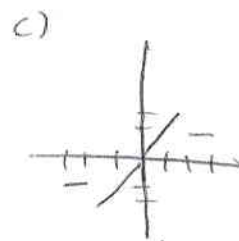
1. Extend the function $f(x) = \begin{cases} x, & 0 < x < 2 \\ 1, & 2 \leq x < 3 \end{cases}$ to obtain a) 0 on the interval $(-L,0)$, b) a cosine series, c) a sine series. Sketch the graph of each.



$$f(x) = \begin{cases} 0 & -3 \leq x < 0 \\ x & 0 \leq x < 2 \\ 1 & 2 \leq x < 3 \end{cases}$$



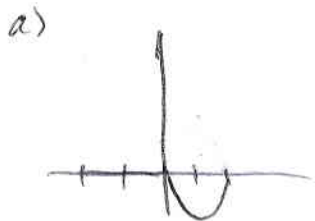
$$f(x) = \begin{cases} 1 & -3 \leq x < -2 \\ -x & -2 \leq x < 0 \\ x & 0 \leq x < 2 \\ 1 & 2 \leq x < 3 \end{cases}$$



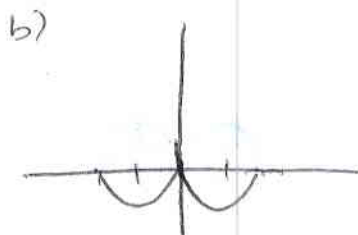
$$f(x) = \begin{cases} -1 & -3 \leq x < -2 \\ x & -2 \leq x < 2 \\ 1 & 2 \leq x < 3 \end{cases}$$

2. Extend the function $f(x) = x^2 - 2x, 0 < x < 2$ to obtain a) 0 on the interval $(-L,0)$, b) a cosine series, c) a sine series. Sketch the graph of each.

$$x^2 - 2x = x(x-2)$$



$$f(x) = \begin{cases} 0 & -2 \leq x < 0 \\ x^2 - 2x & 0 \leq x < 2 \end{cases}$$



$$f(x) = \begin{cases} x^2 + 2x & -2 \leq x < 0 \\ x^2 - 2x & 0 \leq x < 2 \end{cases}$$



$$f(x) = \begin{cases} -x^2 - 2x & -2 \leq x < 0 \\ x^2 - 2x & 0 \leq x < 2 \end{cases}$$