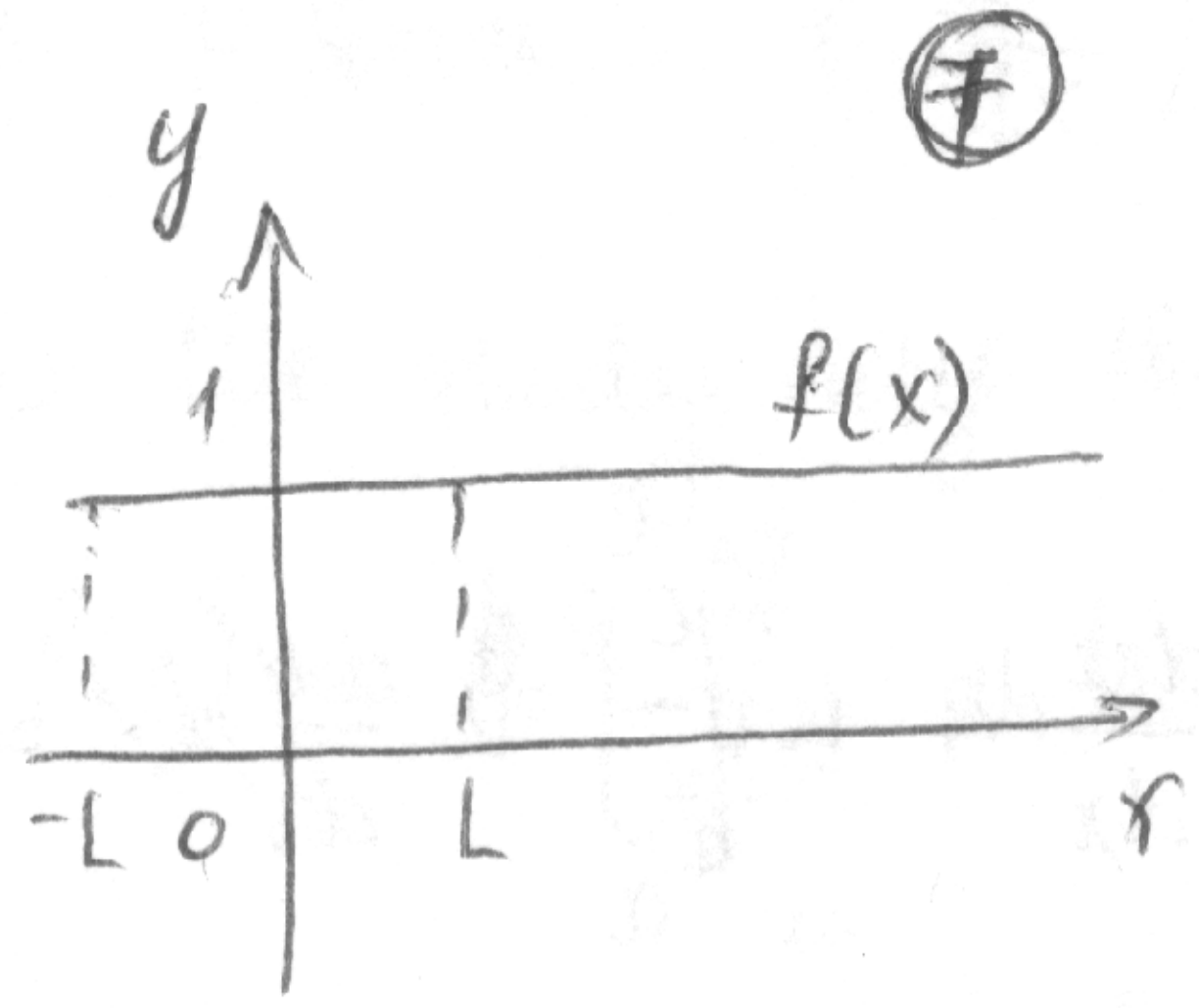


Solution for HW 4. 3.2.1 (ac), 3.2.4, 3.3.4, 3.4.1, 3.4.2, 3.4.3. \rightarrow 100 points

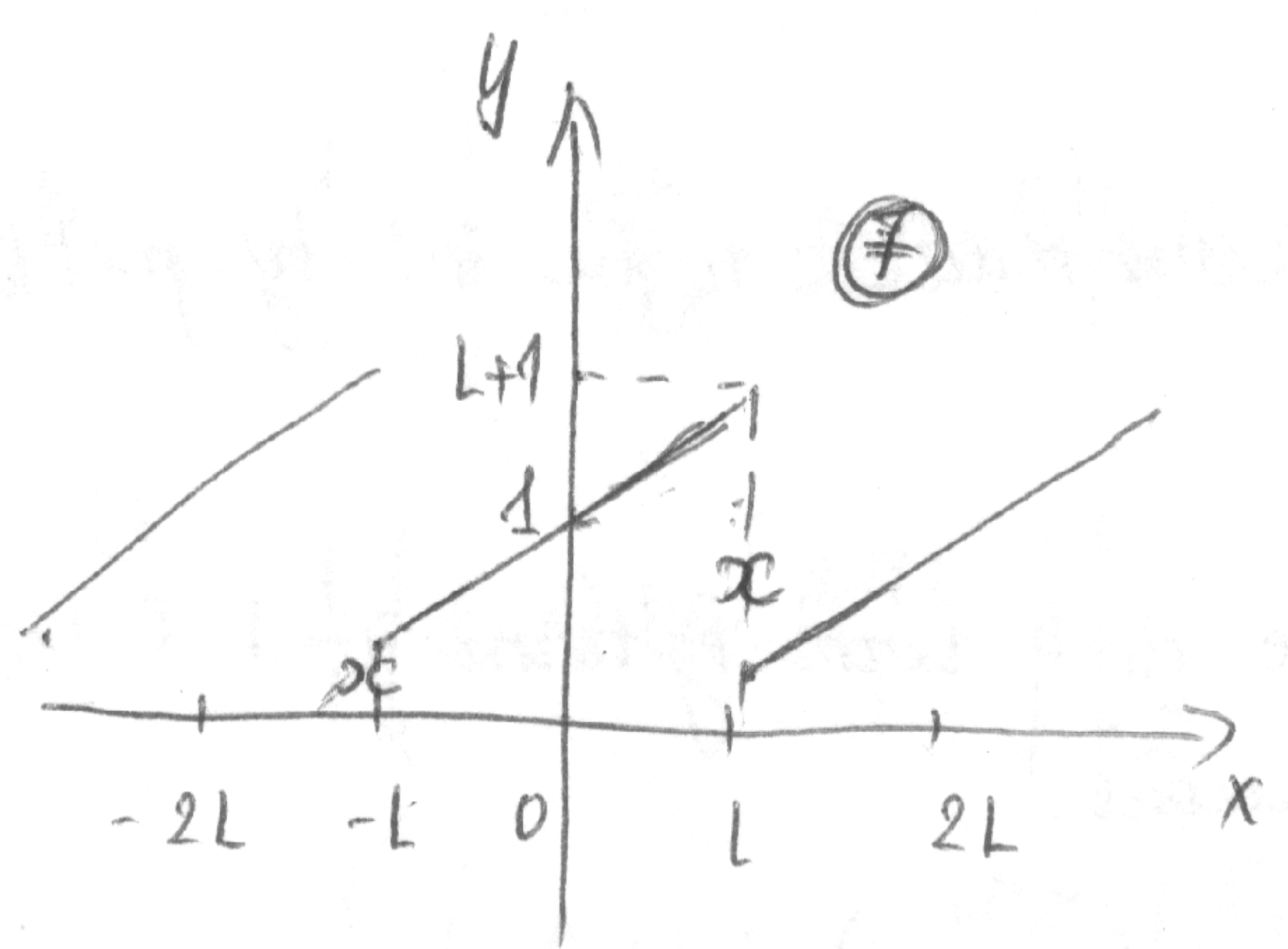
3.2.1. Sketch the Fourier series of $f(x)$ ($-L \leq x \leq L$). Compare to its Fourier series.

a) $f(x) = 1$



$f(x) \equiv$ its F.S., $\forall x \in \mathbb{R}$.

b) $f(x) = 1+x$

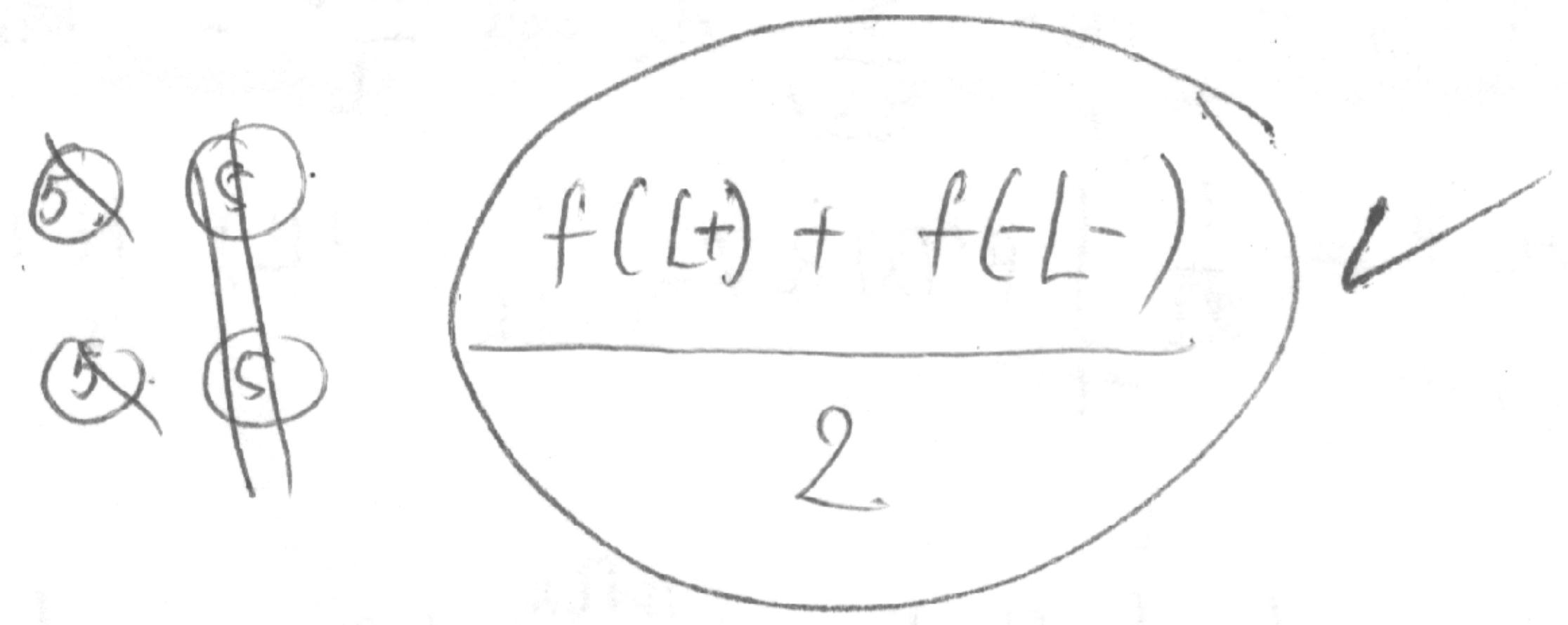


F.S. $(f) = f(x)$ $\forall x \in [-L, L]$, $\neq f(x)$, $\forall x \in \mathbb{R} \setminus [-L, L]$.

3.2.4: $f(x)$ - piecewise smooth. What value does the F.S. of $f(x)$ converge to at $x = \pm L$

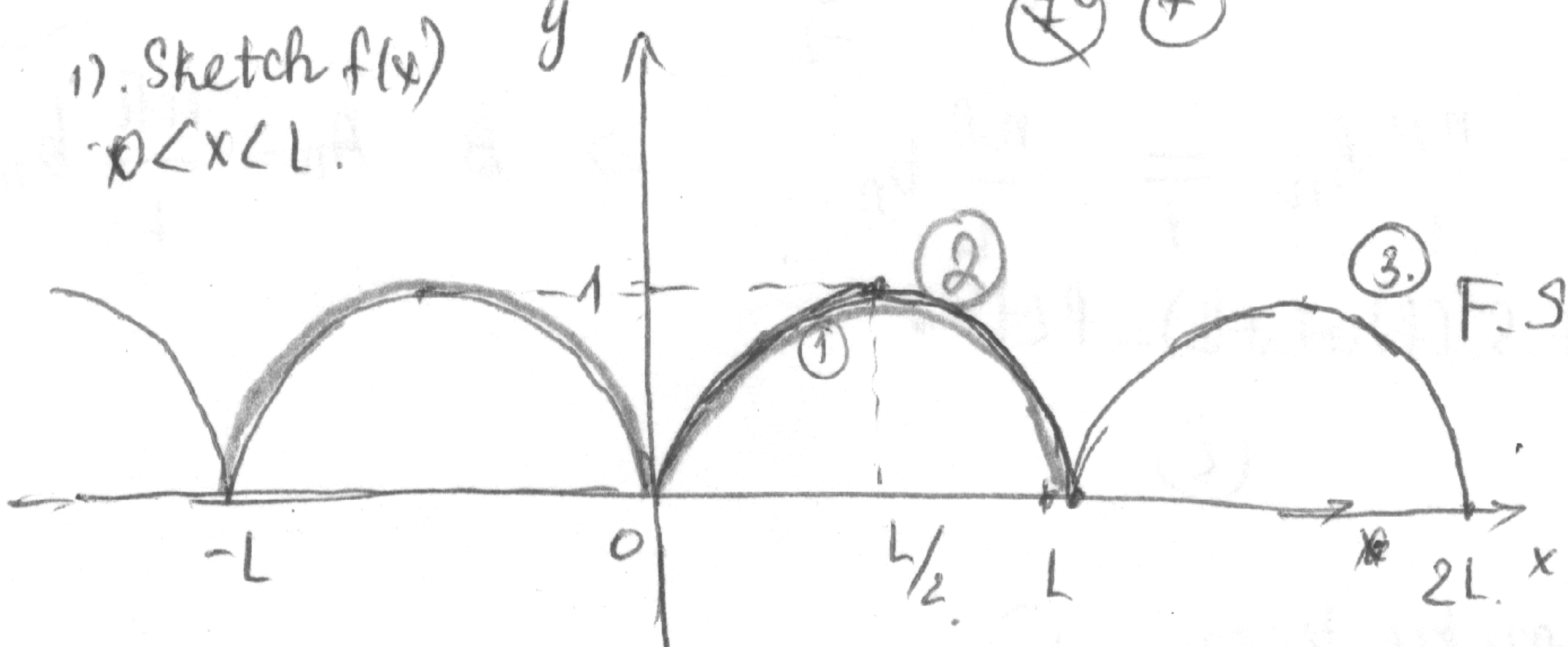
From the convergence theorem for F.S.

at $x = -L$ F.S. $(f) \rightarrow \frac{f(L^-) + f(-L^+)}{2}, x \rightarrow -L$
 $x = L$ F.S. $(f) \rightarrow \frac{f(L^+) + f(-L^-)}{2}, x \rightarrow L$



3.3.4: Sketch F.S. (cosine) of $f(x) = \sin \frac{\pi x}{L}$. briefly discuss:

1) Sketch $f(x)$ $0 < x < L$.



2) Sketch the even extension of $f(x)$

3) Extend as a periodic function (period $2L$)

4) Mark x at points of discontinuity at the average. (no x such point for f)