

Quiz #6

Please, type or write legibly, scan, save file as LASTNAME_FIRSTNAME_Q6.pdf and email to `dlabate@math.uh.edu` or `dlabate@uh.edu`. You need to email to me no later than 11:30AM on Mar 10.

(1) Let $f(x) = \cos^2 x$, for $x \in [-\pi, \pi]$. Compute the Fourier series of $f(x)$ valid in the interval $[-\pi, \pi]$ and discuss its convergence properties (are there any points in $[-\pi, \pi]$ where the Fourier series of f does not converge to f ?).

(2) Sketch the pointwise limit of the Fourier series of the following functions over the interval $[-2, 2]$ (NOTE: the functions are defined on $[-1, 1]$, their Fourier series is 2-periodic).

Without computing the Fourier series, identify (with a mark X) on your graph the x-coordinates - if any - where the Fourier series does not converge to the function.

(a) $f(x) = x^2 - 1$, $-1 \leq x \leq 1$.

(b) $g(x) = x^3$, $-1 \leq x \leq 1$.