MATH 3093 Fourier Analysis

Tutorial 1 (January 13)

The following were discussed in the tutorial this week:

1. Solving the linear ODE:
$$y' + ay = 0,$$
where $a \in \mathbb{R}$ is a constant.

2. Derivation of the heat equation in the plane.

3. Definition of Fourier series and its N-th partial sum $S_N(f)$.

4. Let $0 < a < \pi$. Compute the Fourier series of the function $f : [-\pi, \pi] \to \mathbb{R}$ given by
$$f(x) = \begin{cases} a^{-2}(a - |x|), & \text{if } |x| \leq a; \\ 0, & \text{otherwise.} \end{cases}$$
Show that $S_N(f)$ converges to f uniformly on $[-\pi, \pi]$.