Final review

Here is a list that may help you prepare the exam, though they may not include all the material that would appear on the exam.

1. Important theorems and statements: basic convergence properties of Fourier series, Dirichlet's theorem, Riemann-Lebesgue, Parseval, Plancherel, Hausdorff-Young (statement only), Poisson summation formula;

2. Distributions: definitions of Schwartz space, tempered distributions and their derivatives, basic operations with distributions.

3. Computations of Fourier transforms: Gaussian, $|x|^{-d+\alpha}\big(\alpha \in (0,d)\big)$, and $\mathrm{pv}(1/x)$;

4. PDEs: how to solve heat equation (both on the circle and on $\mathbb{R}^d$) and Poisson's equation ($\mathbb{R}^d$, $d \geq 3$);

5. Hilbert transform: definition, isometry in L^2; L^p boundedness for $p \neq 2$ is **not** required.