Distributions Ref: Wikipedia, Max's notes

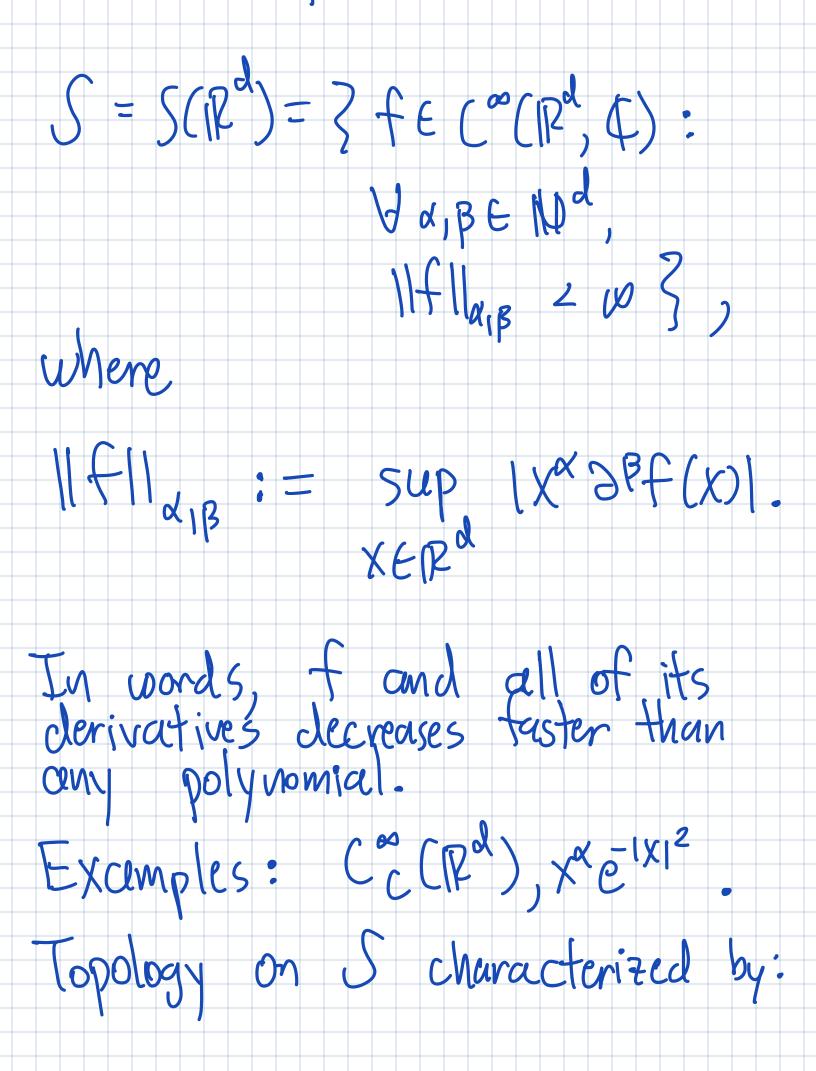
Formalize the notion of an object which is pointwise ill-defined, yet "averages" are well-defined.

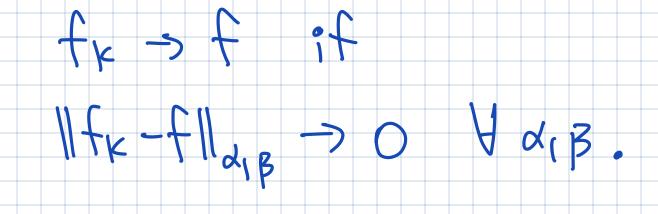
Notation. Given multi-index  $\alpha = (\alpha_1, ..., \alpha_d) \in \mathbb{N}^d$ ,

et  $d = d^{1} \cdot \cdot \cdot d^{1}$ 

 $\chi^{\alpha} = \chi^{\alpha}_{1} - \cdot \chi^{\alpha}_{d}$ 

Natural space of test functions: Schoartz space

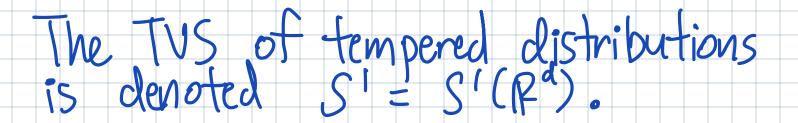


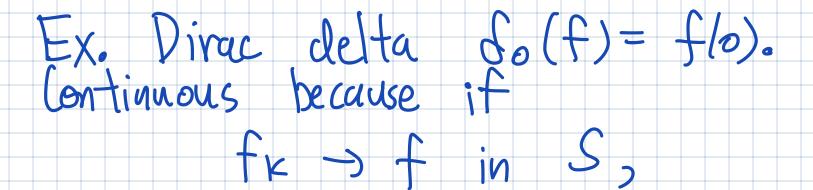


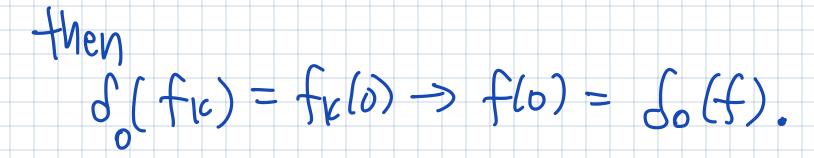
This makes S into a Frechet space (a complete matrizade TUS whose topology comes from countable family of seminorms).

Def. A tempered distribution is a continuous linear functional

 $\varphi : S \rightarrow \emptyset$ 









3 1 -1 JB dt dt dt dt

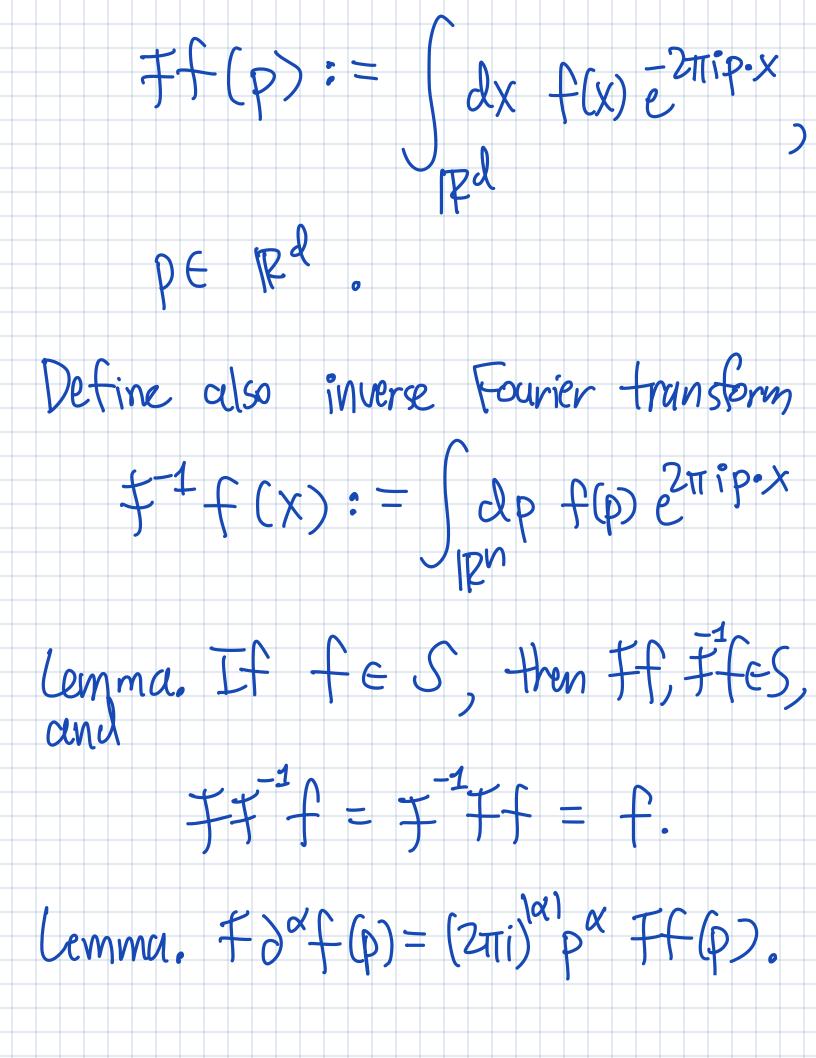
which means

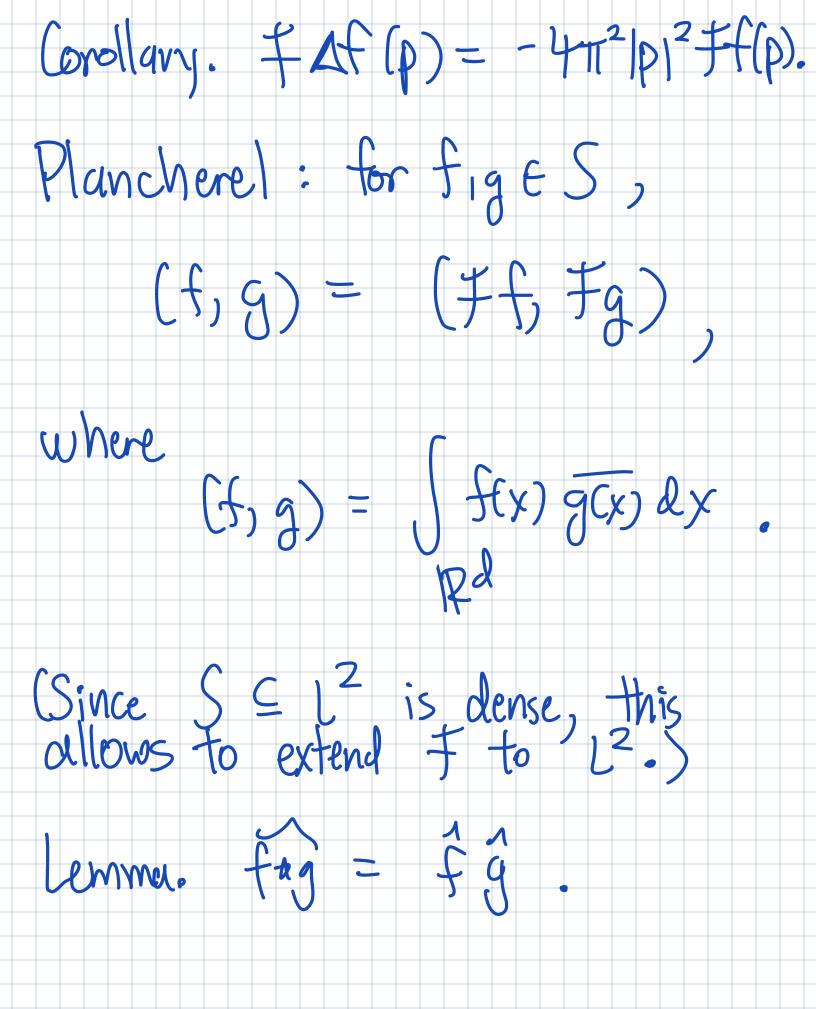


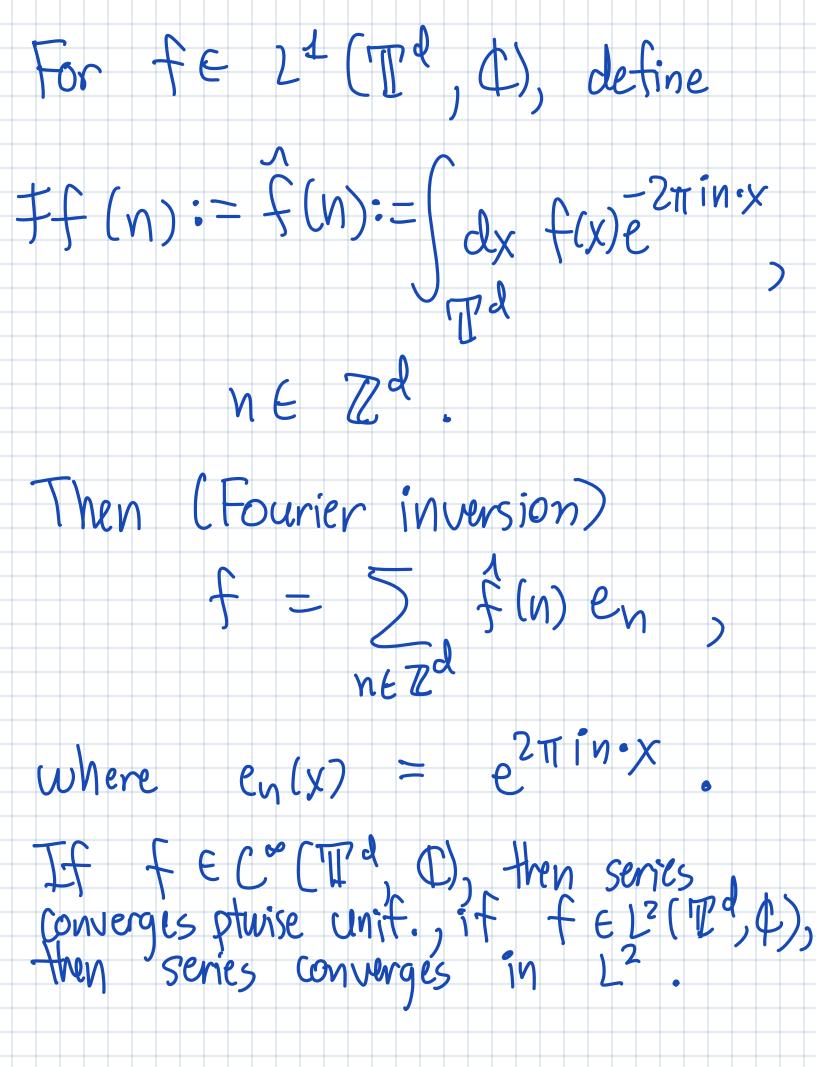
One can then show that a.s., this is continuous, and thus is a tempered distribution.

Fourier transform

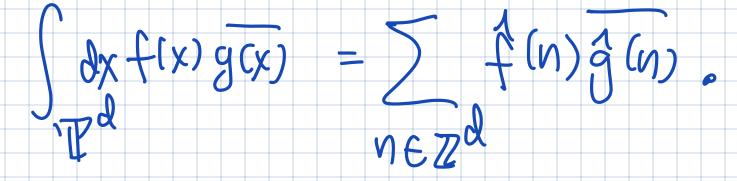
For fe L<sup>1</sup>(R<sup>d</sup>, ¢), define

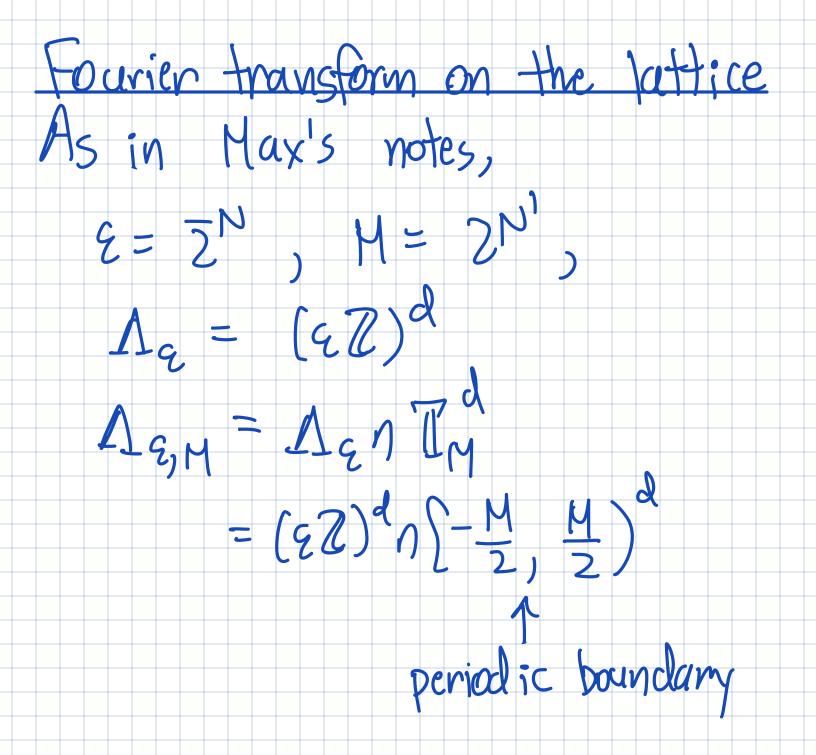


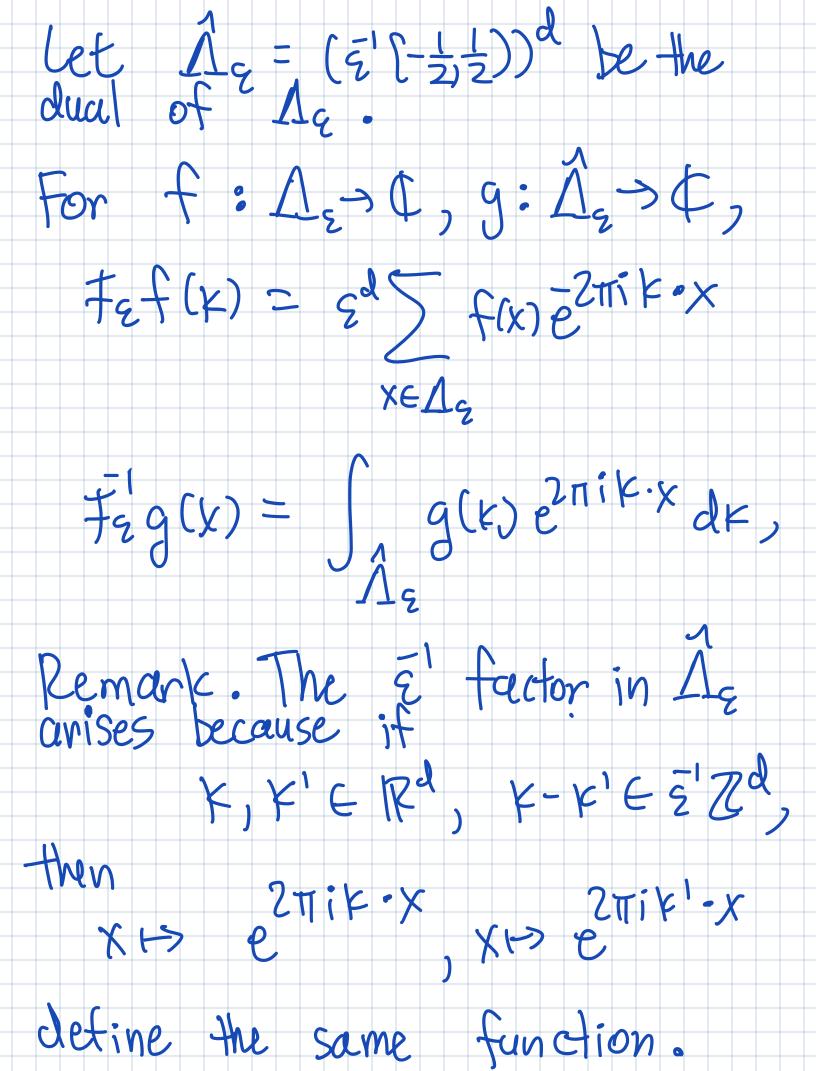


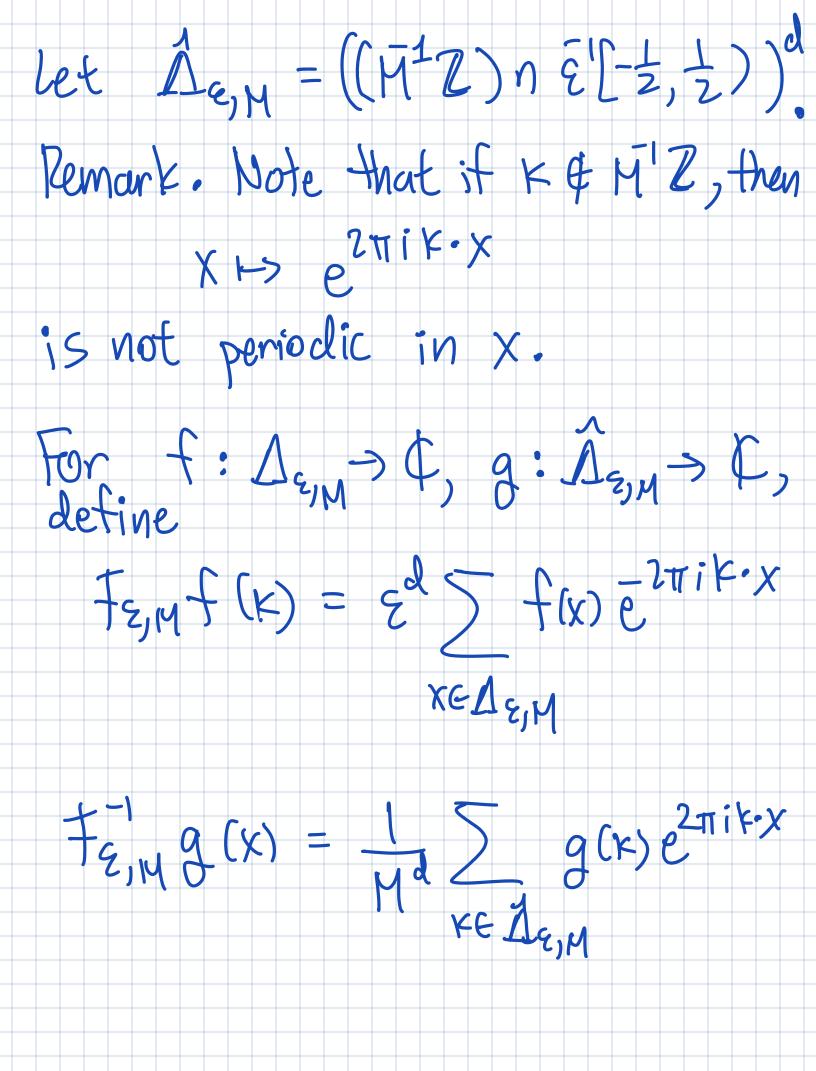


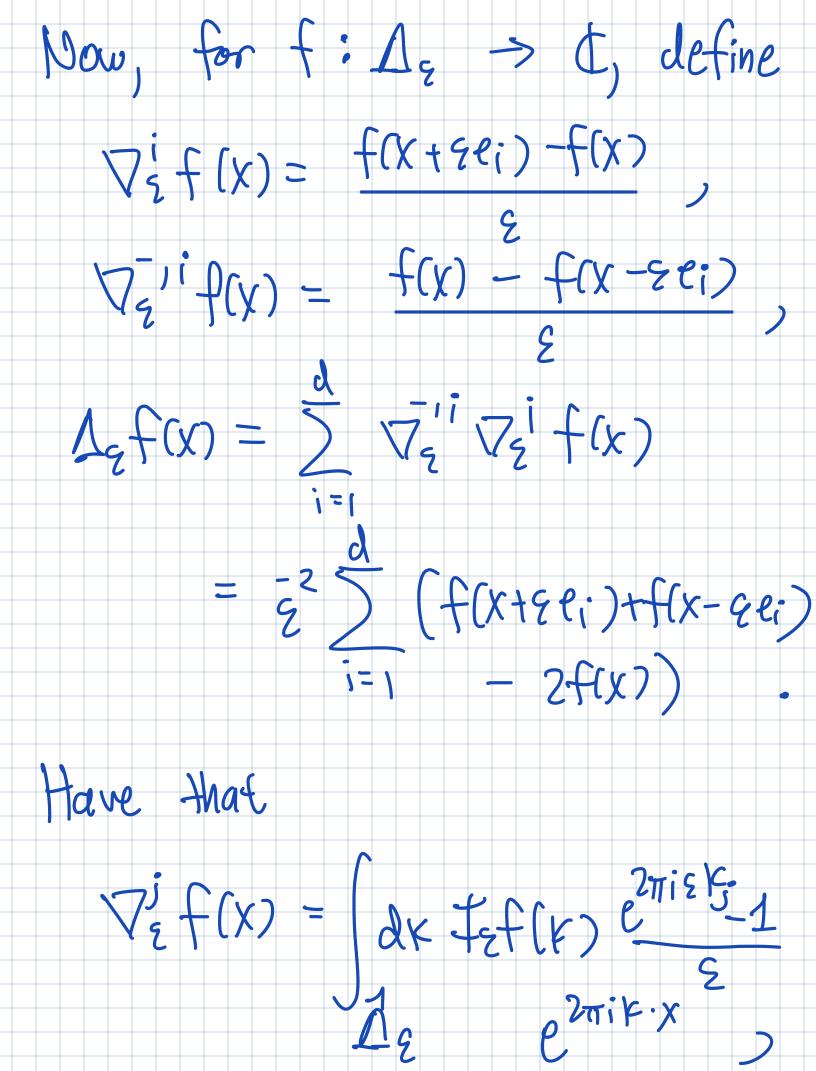
Plancherel:

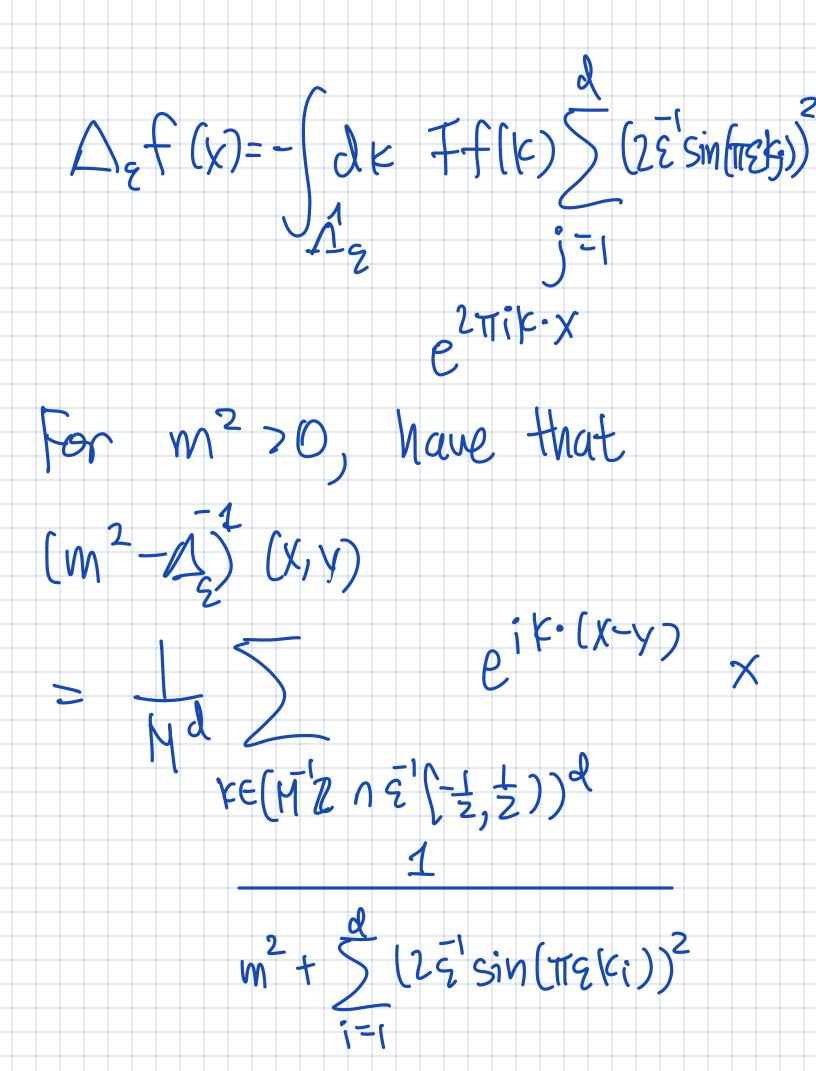














## How to remember the formal identity

