• Any inner product  $\langle \cdot \mid \cdot \rangle$  on a vector space V defines a norm on it, given by:

$$\|v\| \coloneqq \sqrt{\langle v \mid v \rangle}$$

• For any inner product, the Cauchy-Schwarz inequality holds: for any  $v, w \in V$ :

$$\langle v \mid w \rangle \le \|v\| \|w\|.$$

• For  $a, b \in \mathbb{R}$ , C([a, b]) is the set of continuous (real or complex, depending on the context) functions on [a, b]. Continuous (real or complex) functions on a compact set are bounded, therefore have a finite  $L_2$ -norm. For the sake of exercise (14), it's only important that the expressions all make sense.