1. **True/False**: $\| x + y \|^2 \leq \| x \|^2 + \| y \|^2$.

2. **True/False**: One way of defining the $l^p$ inner product is

   $$(x, y) = \sum_{j \geq 1} \xi_j^{p/2} \eta_j^{p/2},$$

   where $x = (\xi_j)$ and $y = (\eta_j)$.

3. **True/False**: Unfortunately, the norm $\| x \| = \max_{t \in [a, b]} | x(t) |$ for $x \in C[a, b]$ can not be obtained from an inner product.

4. **True/False**: Let $Y$ be an open subspace of a Hilbert space $H$. Then $Y$ is complete.

5. **True/False**: Suppose $(Sv, v) = 0$ for all $v$ in a complex Hilbert space $H$, where $S$ is a bounded linear operator. Then $S = 0$.

6. **True/False**: A bounded bilinear form $a(\cdot, \cdot) \geq 0$ defines a norm by $\| v \|^2 := a(v, v)$.

7. **True/False**: If a Hilbert space $H$ contains a total orthogonal sequence, then $H$ is separable.
8. **True/False:** Let $f \in L^2[0,1]$. Assume that $(e_k)$ is an orthonormal sequence in $L^2[0,1]$. Put

$$\tilde{f} = \sum_{k \geq 1} (f, e_k) e_k.$$ 

Then $f = \tilde{f}$.

9. **True/False:** If $x \perp y$, then $\|x + y\|^2 = \|x\|^2 + \|y\|^2$.

10. **True/False:** Suppose $(Sv, v) = 0$ for some $v$ in a complex Hilbert space $H$, where $S$ is a bounded linear operator. Then $Sv = 0$.

11. **True/False:** A bounded coercive bilinear form defines an inner product by $(u, v) := a(u, v)$. 