Recall the inner products:
1) On $\mathbb{F}^n$: $<u, v> = u_1 \overline{v_1} + \ldots + u_n \overline{v_n}$.
2) If $V$ is the space of piecewise continuous function on $[0, 1[$ then $<f, g> = \int_0^1 f(t) \overline{g(t)} \, dt$.
Recall also that two vectors are said to be orthogonal if $<u, v> = 0$.

The norm of a vector is the real number $\|u\| = \sqrt{<u, u>}$.

Evaluate the following inner products:

1) $<(1, 3, 4), (3, -1, 4)> =$

2) $<(i, 1 + i, 3), (i, 2 - i, 2)> =$

3) $f(t) = t$ and $g(t) = e^t$.

4) $f(t) = \varphi_1^2(t)$ and $g(t) = \varphi_3^2(t)$. $<f, g> =$

5) $f(t) = \varphi(t)$ and $g(t) = \psi(t)$. $<f, g> =$

Evaluate the norm of the following vectors:

6) $u = (1, 2, -2)$. $\|u\| =$

7) $u = (1, i)$. $\|u\| =$

8) $f(t) = t + it^2$. $\|f\| =$

9) $f(t) = \psi(t)$. $\|f\| =$

Are the following vectors orthogonal or not?

10) $u = (1, -1, 2)$ and $v = (1, 1, 0)$.

11) $f(t) = \cos(2\pi t)$ and $g(t) = \sin(2\pi t)$.

12) $f(t) = \varphi_0^2(t)$ and $g(t) = \psi_0^2(t)$.

13) $f(t) = t$ and $g(t) = t^2$.

14) $f(t) = t$ and $g(t) = 3t - 4t^2$. 