2) $\langle f, g \rangle = \int_{-\infty}^{+\infty} f(t) \cdot g(t) \, dt$

$f(t) = t \, e^{-t^2/2}$

i) $f_0(t) = \frac{f(t)}{\text{norm}(f_0)}$

$f_1(t) = \frac{f(t) - (f_0 \cdot f(t)) \cdot f_0}{\text{norm}}$

ii) $g(t) = e^{-t^2/2} \cos(t)$

$\rightarrow$ projection $= (f_0 \cdot g) f_0 + (f_1 \cdot g) f_1 + (f_2 \cdot g) f_2 + (f_3 \cdot g) f_3 + (f_4 \cdot g) f_4$