1. Show that the given functions are orthogonal on the given interval.

\[ f_1(x) = e^{x^2}x^7, \quad f_2(x) = e^{-x^2}(x^4 + x^2 + 1), \quad [-2, 2]. \]

2. Show that \{\cos nx\}, \ n = 1, 2, \ldots \ is orthogonal over the interval \([0, \pi]\). Also find the norm of each function.