Homework 5, due 10-14

1. Consider a one-dimensional harmonic oscillator with Hamiltonian $H = p^2/(2m) + m\omega^2 x^2/2$. In the energy basis $H|n\rangle = |n\rangle E_n$ with $E_n = \hbar\omega(n + 1/2)$ $(n \geq 0)$ compute the matrix elements $\langle m|x|n\rangle$, $\langle m|x^2|n\rangle$, $\langle m|p|n\rangle$, $\langle m|p^2|n\rangle$, $\langle m|\{x, p\}|n\rangle$ for arbitrary m, n.