Worksheet #6

(Friday, January 16, 2026)

Name

Questions (5 pts):

Express momentum and position operators in terms of raising and lowering operators and use the number representation to calculate:

(a) Expectation value of momentum operator in an energy eigenstate $|n>$, i.e.

$<P> = <n|P|n> =$

(b) Expectation value of position operator-squared in an energy eigenstate $|n>$, i.e.

$<X^2> = <n|X^2|n> =$