

Worksheet #5

(Wednesday, January 14, 2026)

Name**Question (5 pts):**

Consider the number operator $N = a^\dagger a$, where a^\dagger and a are creation and annihilation operators, respectively.

(a) Find the commutator $[N, a^\dagger]$

(b) Use properties of the number operator N to find the following:

$$\langle n | a^\dagger a | n \rangle =$$

$$\langle n | a a^\dagger | n \rangle =$$