**Exercise 1.** Show that $[a, a^\dagger] = 1$, using $a = (x + ip)/\sqrt{2}$ (with scaled units).

**Exercise 2.** Prove (by induction) that

$$\left(x - \partial_x\right)^n e^{-x^2/2} = (-1)^n e^{x^2/2} \partial_x^n e^{-x^2}. \tag{1}$$