

## 1 One-dimensional gas

Consider an ideal gas of  $N$  particles, each of mass  $M$ , confined to a one-dimensional line of length  $L$ . The particles have spin zero (so you can ignore spin) and do not interact with one another. Find the entropy at temperature  $T$ . You may assume that the temperature is high enough that  $k_B T$  is much greater than the ground state energy of one particle.