April 10, 2020. Quiz 1, due 5pm, Saturday 4/11. :

Quiz problem 1: Given the equation of state below, what is the amount of work done when a system isothermally expands from initial volume V_0 to final volume $2V_0$?

$$p = \frac{Nk_BT}{V - Nb}$$

Quiz problem 2:   An ideal gas is contained in a cylinder with a tightly fitting piston. Several small masses are on the piston. (Neglect friction between the piston and cylinder walls.) The cylinder is placed in an insulating jacket, and a large number of masses are then added to the piston.

You may use the following properties of an ideal gas:

- The internal energy is a function of N and T only.

- $pV = Nk_BT$

Tell whether the pressure, temperature, and volume of the gas will increase, decrease, or remain the same. Explain.
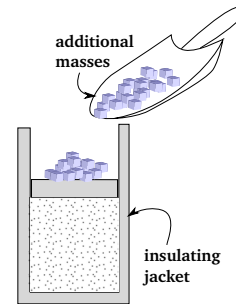
Quiz problem 3:   Given the definitions below, evaluate the requested partial derivative.

$$U = x^2 + y^2 + z^2$$
$$z = \ln(y - x) + x^2$$

Find $\left(\dfrac{\partial U}{\partial z}\right)_y$