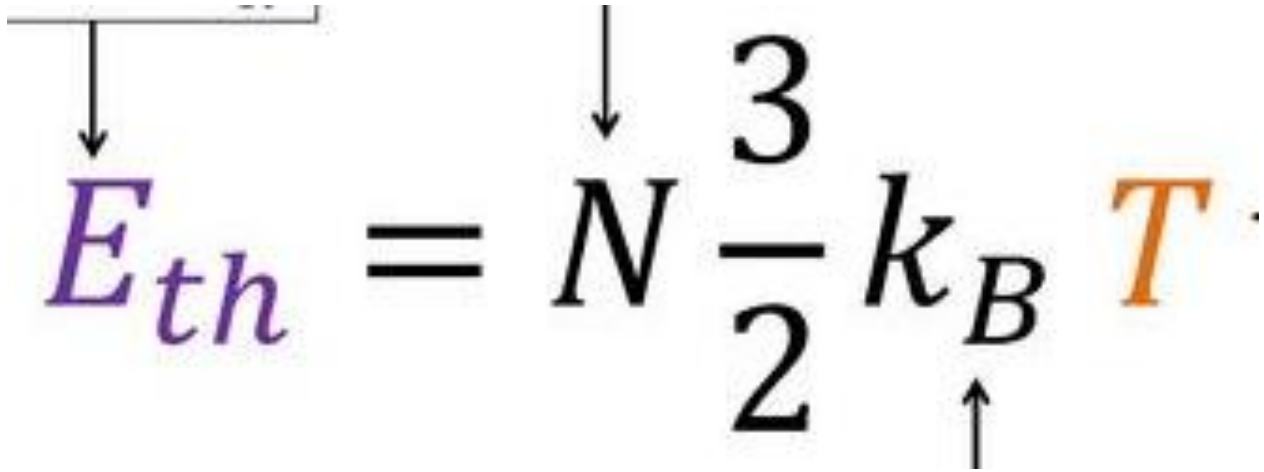
PH202 Recitation 4

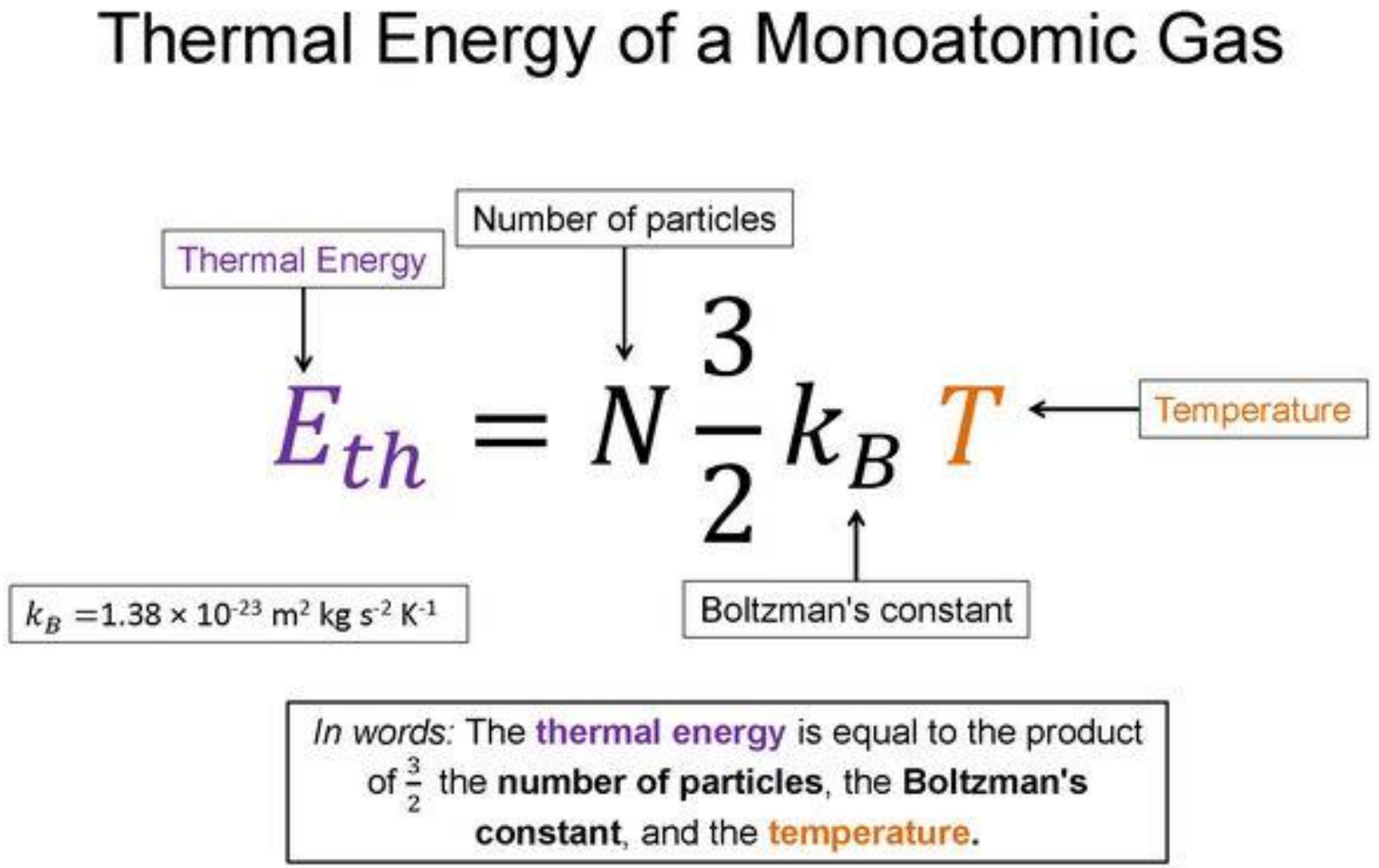
Thermodynamics Part 1

Warm-Up 1

- Say the equation in words

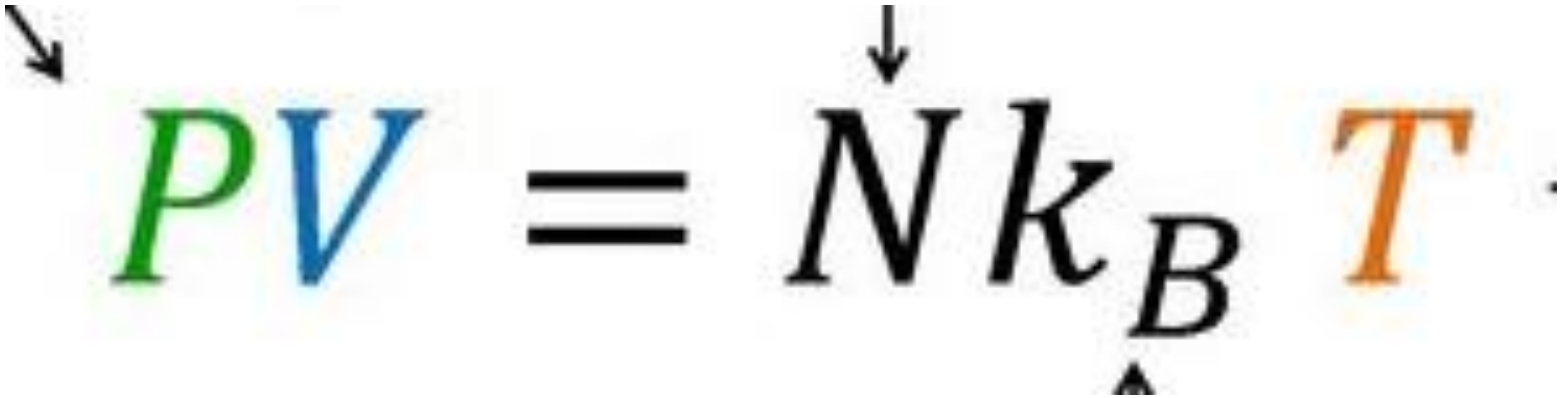


Warm-Up 1 Solution

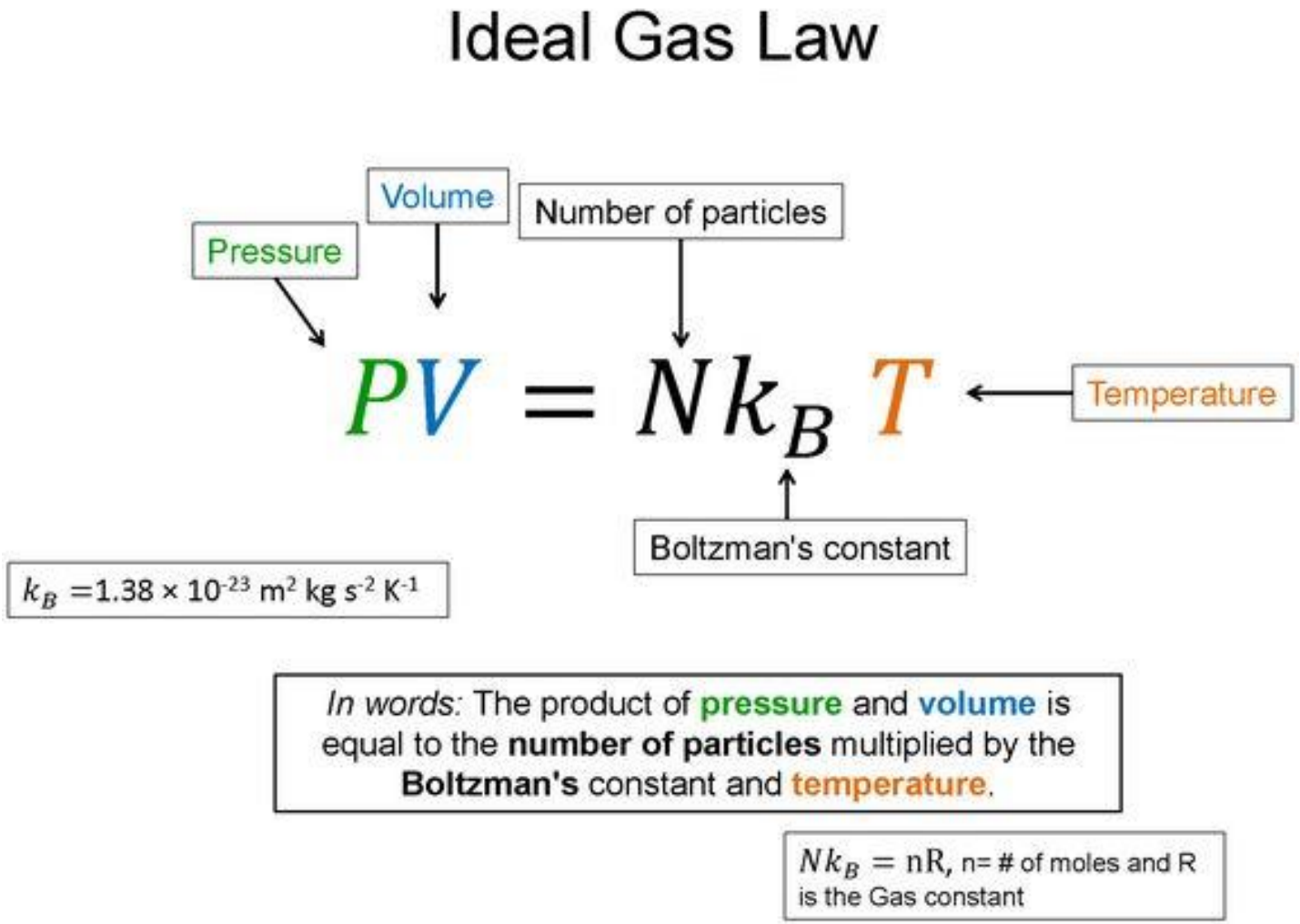


Warm-Up 2

- Say this equation in words



Warm-Up 2 Solution

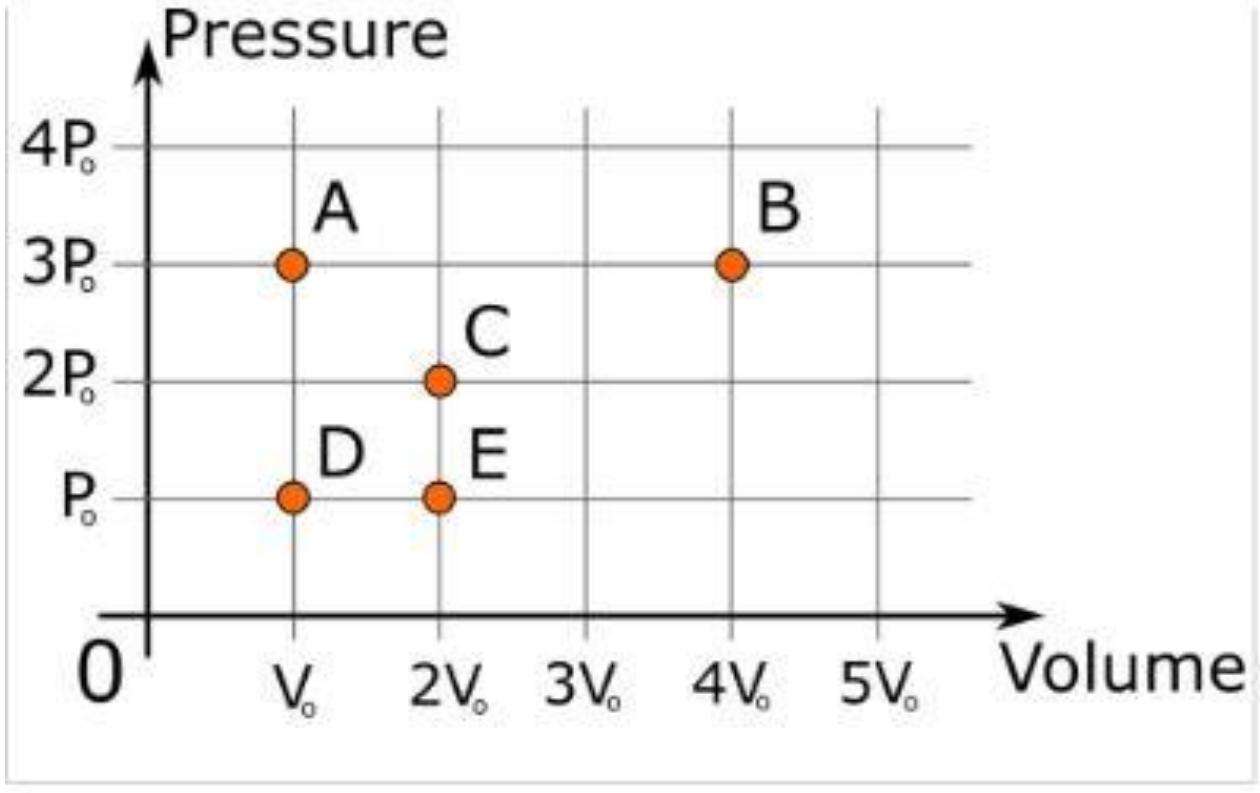


Discussion Question 1: 3 minutes

- What is the average kinetic energy of a monoatomic gas molecule at 20°C?
- What is the rms speed of a Helium (4g/mol) molecule at this temperature?

Discussion Question 2: 3 minutes

- Each of the five points represent five different equilibrium states for a one mole of an ideal gas. Rank the temperatures of the different states.



Discussion Question 3: 3 minutes

- An ideal gas is in a sealed container. By what factor does the gas pressure change if
  A. The volume is doubled and the temperature is tripled?
  B. The volume is halved and the temperature is tripled?

Discussion Question 4: 3 minutes

- Calculate the number of molecules in a cubic meter of an ideal gas at standard temperature and pressure (STP). How many moles of gas is this?

Question 1: 7 minutes

- I have 2 moles of a monatomic gas that is initially at a temperature of 500K. If 5000J of heat is added to the gas and the gas performs 7.5kJ of work, what is the final temperature of the gas?

Question 2: 7 minutes

- Compute the internal energy change and temperature change for the 2 processes involving 1 mole of an ideal monatomic gas.
  A. 1500 J of heat are added to the gas and the gas does no work and no work is done on the gas
  B. 1500 J of work are done on the gas and the gas does no work and no heat is added or taken away from the gas