Homework 23.

Below are the homework problems. To solve these you have to use the equation of state of the ideal gas:

$$PV = nRT$$

1. Find the mass of oxygen in the 10 liter cylinder if at T=13°C the pressure P=9x10⁶Pa.

2. How many molecules move out of the room if the temperature inside is increased from T=15°C to 25°C if the room volume is 120m³ and atmospheric pressure is 10⁵Pa? Assume that the air is an ideal gas with average molar mass of 29g/mol.

   There are no sealed living rooms - the air molecules can travel inside and outside. To solve the problem, you have to answer the question: why more molecules move out of the room than into the room as we increase the room temperature.

3. (*More difficult*). Two identical cylinders are connected with a tube. The volume of the tube is very small. The cylinders are filled with gas at a temperature T. How many times does the pressure in the system change if we will heat one of the cylinders to temperature T₁ and maintain the other at the temperature T?

   First step to solving this problem is answering the question: will the pressure be the same in the cylinders after we increase the temperature of one of them?