

Boyle's Charles & Pressure (Homework)

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1.

Convert the following pressures into atmospheres.

(a) 109.9 kPa

(b) 77.1 cm Hg

(c) 723 mm Hg

(d) 753 torr

2.

Which of the following is a mathematical expression that summarizes Boyle's law?

3.

For each of the following sets of pressure/volume data, calculate the missing quantity. Assume that the temperature and the amount of gas remain constant.

(a) $V = 529$ mL at 1.00 atm. What is the volume at 671 torr?

(b) $V = 2.09$ L at 110.9 kPa. What is the volume at 0.993 atm?

(c) $V = 4.09$ mL at 141 atm. What is the pressure if the volume changes to 12.0 mL?

4.

If the pressure exerted on the gas in a weather balloon decreases from 1.03 atm to 0.571 atm as it rises, by what factor will the volume of the gas in the balloon increase as it rises?

5.

Which of the following is a mathematical expression that summarizes Charles' law?

6.

Which of the following is a mathematical expression that summarizes Avogadro's law?

7.

If 2.05 g of helium gas occupies a volume of 15.0 L at 21°C, what volume will 6.85 g of helium gas occupy under the same conditions?

8.

The volume of a gas at 97.0 kPa is 500.0 mL. If the pressure is increased to 219 kPa, what will be the new volume?

9.

The pressure of a sample of helium in a 3.84 L container is 0.988 atm. What is the new pressure if the sample is placed in a 3.13 L container?

10.

The Celsius temperature of a 1.25 L sample of gas is lowered from 80.0°C to 21.0°C. What will be the resulting volume of this gas?

11.

If a gas sample has a pressure of 30.7 kPa at 0.00°C, by how much does the temperature have to decrease to lower the pressure to 28.7 kPa?

12.

If it takes 0.0471 L of oxygen gas kept in a cylinder under pressure to fill an evacuated 6.65 L reaction vessel in which the pressure is 0.980 atm, what was the initial pressure of the gas in the cylinder?

13.

A gas in a sealed container has a pressure of 135 kPa at a temperature of 30.0°C. If the pressure in the container is increased to 229 kPa, what is the new temperature?

14.

The pressure in an automobile tire is 1.91 atm at 23.0°C. What will be the pressure if the temperature warms up to 37.0°C?