

Name:

Gas Laws Worksheet - Boyle's, Charles', Gay-Lussac's, and Combined Gas Law

Solve all problems – you must show your work (including units).

Boyle's Law

1. A gas sample contained in a cylinder equipped with a moveable piston occupied 300.0 mL at a pressure of 2.00 atm. What would be the final pressure if the volume were increased to 500.0 mL at constant temperature?
2. A balloon that contains 1.50 L of air at 1.00 atm is taken underwater to a depth at which the pressure is 3.00 atm. Calculate the new volume of the balloon. Assume that the temperature remains constant.
3. A 50.0 L sample of gas collected in the upper atmosphere at a pressure of 18.3 torr is compressed into a 150.0 mL container at the same temperature.
 - a. What is the new pressure, in atm?
 - b. To what volume would the original sample have had to be compressed to exert a pressure of 10.0 atm?
4. A sample of krypton gas occupies 75.0 mL at 0.400 atm. If the temperature remained constant, what volume would the krypton occupy at
 - a. 4.00 atm
 - b. 765 torr
 - c. 4.00 torr

Charles' Law

1. Several balloons are inflated with helium to a volume of 0.75 L at 300 K. One of the balloons was found several hours later, the temperature had dropped to 295 K. What would be the volume of the balloon when found, if no helium has escaped?
2. A fixed quantity of gas at 23.0°C exhibits a pressure of 748 torr and occupies a volume of 10.3 L. Calculate the volume the gas will occupy if the temperature is increased to 145°C while the pressure is held constant.
3. A sample of gas occupies a volume of 7.50 L at 0.988 atm and 301 K. At what temperature is the volume of the gas 4.00 L if the pressure is kept constant.
4. A gas occupies a volume of 100.0 mL at 300 K and 630.0 torr. At what temperature would a volume of 50.0 mL be at 630.0 torr?

Gay-Lussac's Law

1. A sample of gas occupies 10.0 L at 100.0 torr and 300 K. Calculate the pressure if the temperature is changed to 127°C while the volume remains constant.
2. The temperature of 200.0 mL of a gas originally at STP is changed to 248 K at constant volume. Calculate the pressure of the gas in atm.
3. A gas occupies a volume of 50.0 mL at 300 K and 630 mmHg. At what temperature would the pressure be 101.3 kPa if the volume remains constant?

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Combined Gas Law

1. A 280.0 mL sample of neon exerts a pressure of 660.0 torr at 26.0°C. At what temperature would it exert a pressure of 940. torr in a volume of 0.44 L?
2. A certain gas has a volume of 500.0 mL at 350 K and 600.0 torr. Calculate the temperature if the volume decreased to 400.0 mL an the pressure is increased to 1.00 atm.
3. A given sample of gas has a volume of 4.20 L at 60.0°C and 1.00 atm pressure. Calculate its pressure if the volume is changed to 5.00 L and the temperature to 300 K.
4. A gas has a volume of 0.24 L at 298 K and 600.0 mmHg. Calculate its volume at STP.
5. A certain gas occupies a volume of 0.55 L at STP. What would its volume be at 27.0°C and 125.0 kPa?