Charles' Law Practice

STP = "Standard Temperature and Pressure"
Standard Temperature = 273 K
Standard Pressure = 1.00 atm = 101.325 kPa = 760 mm Hg = 760 torr
Kelvin = Celsius + 273
Charles' Law is a direct relationship.

Most of these problems can be done in your head without showing your work.

1. Frau Freud and her friend Klaus have 36 L of helium trapped in a steel cylinder by a piston at a temperature of 200 K.
   A) What will the volume of the gas become if the temperature is lowered to 100 K?
   B) What will the volume of the gas become if the temperature is raised to 400 K?
   C) What will the volume of the gas become if the temperature is raised to 300 K?
   D) What will the temperature need to be for the gas to occupy a volume of 9 L?
   E) What will the temperature need to be for the gas to occupy a volume of 81 L?

2. Roger and Virginia took 400 mL of He gas and performed an experiment in which they heated and cooled it and then measured the resulting volumes. Here is their data. Make a graph of their data and use it to answer the following questions.

Temperature (K)	Volume (mL)
240	480
280	560
320	640
360	720
400	800
440	880
480	960
520	1040
560	1120
600	1200

   A) Predict the volume for a temperature of 300 K.
   B) Predict the volume for a temperature of 530 K.
   C) Predict the volume for a temperature of 800 K.
   D) Predict the temperature needed for a volume of 1000 mL.
   E) Predict the temperature needed for a volume of 700 mL.
   F) Predict the temperature needed for a volume of 320 mL.

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Please use your head, but show your work in the manner demonstrated by your instructor. Remember to include the correct units and round off to significant digits.

These problems should be done on a separate sheet of paper.

3. What will the final volume be for a gas if its original volume was 400. mL at a temperature of 300. K and its temperature rose to 540 K?

4. Find the final temperature of a gas whose volume changed from 250.0 mL to 50.0 mL. The original temperature of the gas was 720 K.

5. Find the original volume of a gas whose temperature changed from 27.0° C to 177° C. The final volume of the gas was 420 cm^3.

6. What was the original temperature of a gas now at 17.0° C, if its volume changed from 657 cm^3 to 45.8 cm^3?

7. What will the volume of 254 cm^3 of gas be at STP if its original temperature is 72.6° C?

8. What temperature would be needed to change the volume of 275 mL of gaa at 22°C to 500. mL?

9. If you double the temperature of 25 mL of gas from 25°C to 50°C does the volume double?

10. If you double the temperature of 25 mL of gas from 100 K to 200 K is the new volume going to be 50. mL?