Comparing Gas Pressure After Equal Warming

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

Two sealed rigid gas vessels start at the same absolute pressure. They have different starting temperatures. Each warms by 30 °C without a volume change. In each vessel, pressure divided by absolute temperature stays constant. A Celsius temperature difference has the same numerical size in kelvins.

Vessel	Initial temperature (K)	Initial pressure (kPa)	Temperature rise (K)
P	270	90	30
Q	300	90	30

1 Which vessel has the greater fractional increase in absolute temperature?

(1) P only

(2) Q only

(3) Both have the same fractional increase.

(4) Both temperatures decrease.

2 Calculate the final absolute pressure in each vessel. [1]

Answer and work

3 A student says equal initial pressures and equal temperature rises guarantee equal pressure rises. Evaluate the claim with the results. [1]

Answer and work

The display wants Q to end at 100 kPa without changing the amount or volume of its gas.

4 Find the final temperature required for Q. Give the temperature in kelvins to the nearest whole kelvin. [1]

Answer and work