

Question 4

Pressure is $P(V, T) = 8T/V$ kPa, with V in liters and T in kelvins.

Tasks

1. Find $P_V(4, 300)$, $P_T(4, 300)$.
2. Supply units.
3. Interpret each sign.

Question 4 – Solution

Strategy. Vary one physical input while fixing the other.

Step 1: Volume $P_V = -8T/V^2$, so $P_V(4, 300) = -150 \text{ kPa/L}$.

Step 2: Temperature $P_T = 8/V$, so $P_T(4, 300) = 2 \text{ kPa/K}$.

Step 3: Meaning Added volume lowers pressure locally; added temperature raises it. The statements are instantaneous and hold the other variable fixed.