W2-4-3 Ideal gas 3

Consider an ideal gas with a temperature of $T_1 = 300$ K and a specific volume of $v_1 = 0.86$ m^3/kg. As a result of a disruption, the state of the gas changes to $T_2 = 302$ K and $v_2 = 0.87$ m^3/kg ($R = 0.287$ kJ/kgK).

By how much will the pressure change if the volume would have been constant?

When the volume remains constant, then $\dot{v} = 0$ and it follows for the differential that:

$$\dot{P} = \left(\frac{\partial P}{\partial T}\right)_v \dot{T} = \left(\frac{R}{v}\right) \dot{T} = 0.664 \text{ kPa}$$

So, by a constant volume the pressure increases with 0.664 kPa.