Argon, $M = 1.08 \text{ g}$, $p = 8 \text{ atm}$

Also, $A = 40 \text{ m} \Rightarrow M \text{ mol} = 0.041 \frac{12.01}{\text{mol}}$

So, $n = \frac{0.001 \text{ kg}}{M \text{ mol}} = 0.0025 \text{ mol}$

and, $C_v = 12.5 < \frac{1}{\text{mol} \cdot \text{C}}$ \Rightarrow $C_p = 20.8 \frac{1}{\text{mol} \cdot \text{C}}$

a.) For $\Delta T = 100 \text{C}$ at constant volume:

$$Q = nC_v \Delta T = 31.25 \text{ J}$$

b.) What is $\Delta T$ for $Q = 31.25 \text{ J}$ at constant pressure?

$$Q = nC_p \Delta T$$

So, $\Delta T = \frac{Q}{nC_p} = 60.1 \text{C}$

Why the difference?

For $p = \text{constant}$, some of the heat is used in expanding the gas (negative work) instead of raising the temperature. For $V = \text{constant}$, all of the heat is used in raising the temperature.