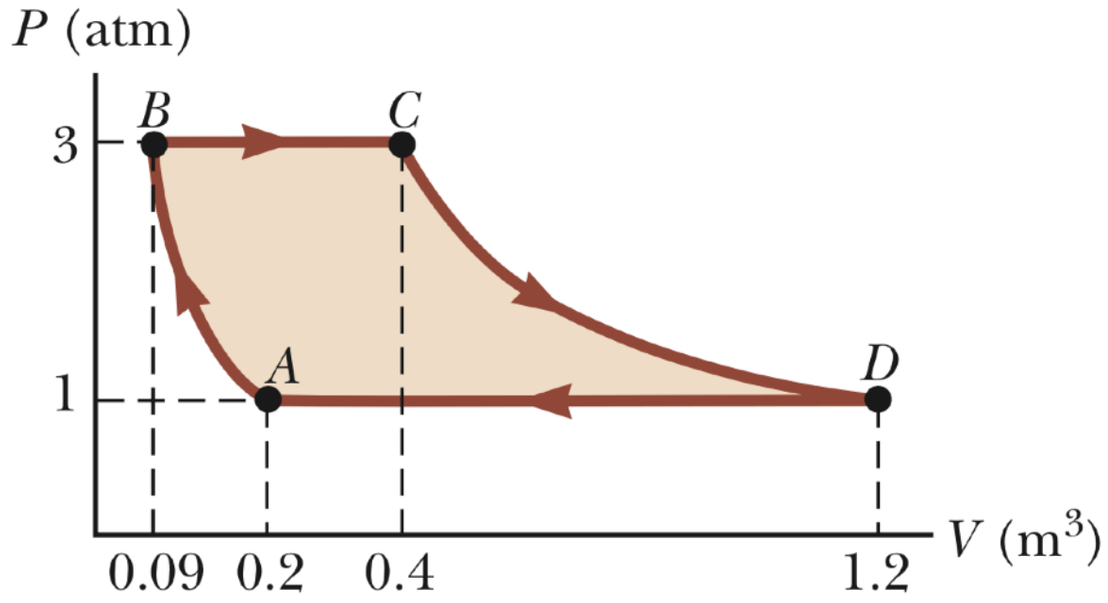
Review: First law of thermodynamics

$\Delta E_{int} = Q + W$		
Process	**Conditions**	**Results**
Isochoric/Isovolumetric		
Isobaric		
Isothermal		
Adiabatic		
Free expansion		
Cyclic		

Example - 5

A sample of an ideal gas goes through the process shown in the Figure. From A to B, the process is adiabatic; from B to C, it is isobaric with 345 kJ of energy entering the system by heat; from C to D, the process is isothermal; and from D to A, it is isobaric with 371 kJ of energy leaving the system by heat. Determine the difference in internal energy $E_{\text{int},B} - E_{\text{int},A}$.

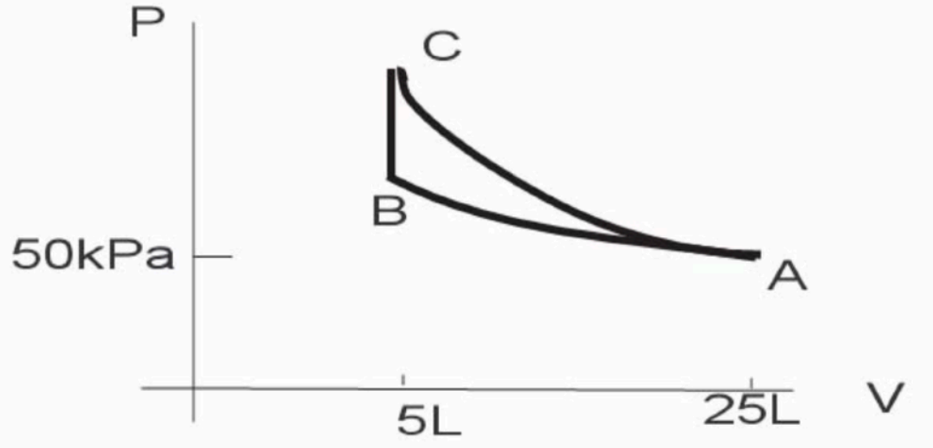


Example - 5

Example - 6

One mole of a gas with γ = 4/3 goes over the cycle ABCA as shown in the Figure where one of AB or AC is isothermal and the other adiabatic. You figure out which.

Write down the (P, V, T) coordinates of A, B and C (some of which are already given). What is the work done in each part of the cycle and the heat absorbed or rejected in the full cycle?



Example - 6

Review: First law of thermodynamics

Example - 7

A copper rod of length 50 cm and radius 2 cm has one end dipped in an ice-water mixture and the other in boiling water. What is the heat flow dQ/dt?

Example - 8

A bar of gold (Au) is in thermal contact with a bar of silver (Ag) of the same length and area. One end of the compound bar is maintained at 80.0°C, and the opposite end is at 30.0°C. When the energy transfer reaches steady state, what is the temperature at the junction?