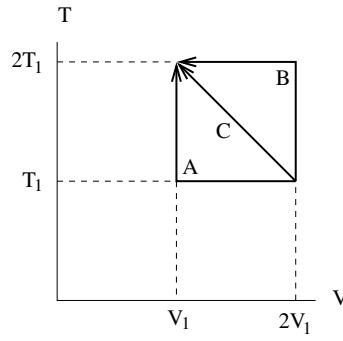


[tex155] **Work performance and heat transfer**

Consider 1mol of a classical ideal gas [ $pV = RT$ ,  $U = \frac{3}{2}RT$ ] confined to a cylinder with a piston and in thermal contact with a heat bath of adjustable temperature. Examine the three quasistatic processes A, B, C, from point  $(2V_1, T_1)$  to point  $(V_1, 2T_1)$  as shown. Calculate the work  $\Delta W_A, \Delta W_B, \Delta W_C$  done by the piston on the gas and the heat  $\Delta Q_A, \Delta Q_B, \Delta Q_C$  transferred between the gas and the environment in each process. Choose the signs for work and heat such that  $\Delta U = \Delta W + \Delta Q$ . Express all results in units of  $RT_1$ . Independently of your calculation, formulate a verbal argument for the ranking of  $\Delta W$  and  $\Delta Q$  of the three processes.



**Solution:**