

path	W	Q	ΔU	ΔS
P -constant	$P\Delta V$	$mc_p\Delta T$	$mc_v\Delta T$	$mc_p \ln(T_f/T_i)$
V -constant	0	$mc_v\Delta T$	$mc_v\Delta T$	$mc_v \ln(T_f/T_i)$
T -constant	$nRT \ln(V_f/V_i)$	$\Delta U + W$	0	$nR \ln(V_f/V_i)$
S -constant	$mc_v\Delta T$	0	$mc_v\Delta T$	0
line	$\frac{1}{2}(P_f + P_i)\Delta V$	$\Delta U + W$	$mc_v\Delta T$	$mc_p \ln(V_f/V_i) + mc_v \ln(P_f/P_i)$
cycle	area	area	0	0

Note: $nR\Delta T = P_fV_f - P_iV_i$

$$c_p = c_v + R/\mu \qquad U = \frac{f}{2} mRT/\mu \qquad c_v = fR/2\mu$$

$$PV^\gamma = \text{constant} \qquad TV^{\gamma-1} = \text{constant} \qquad P^{1-\gamma}T^\gamma = \text{constant}$$

$$\gamma = \frac{c_p}{c_v} = \frac{f+2}{f} \qquad H = U + PV \qquad G = H - TS$$

