Ch. 19

C_V on page 511

Pressure = P

$W = 0 = \int P\,dV$

$\Delta V = 0$

$Q = n C_V \Delta T$ ← heat added

V = Volume

isochoric or isovolumetric

C_p on page 511

$W = P\Delta V = \int P\,dV$

$\Delta P = 0$

$Q = n C_p \Delta T$ ← heat added

isobaric

$PV = nRT$

$PV = NkT$

ideal gas

$\Delta T = 0$

$PV = \text{constant}$

$Q = W$

$W = nRT\Delta(\ln V)$

$W = nRT\int \frac{dV}{V}$

$W = \int P\,dV$

isothermal

$W = \int P\,dV = \ldots$

$Q = 0$

Q = heat added

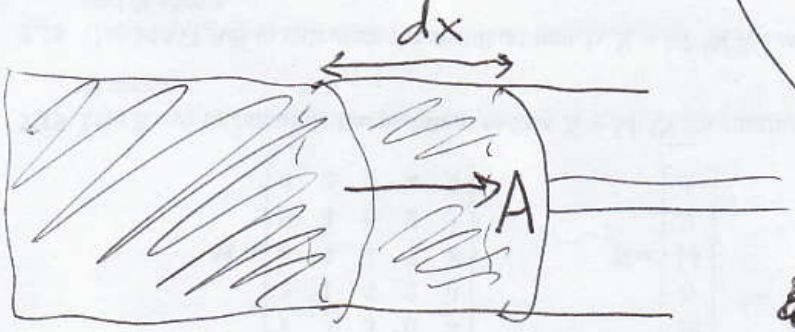
$PV^{\gamma} = \text{constant}$

adiabatic:

gas expands doing work on piston, but no heat is added to gas from surroundings.

γ on page 511 for some gasses.

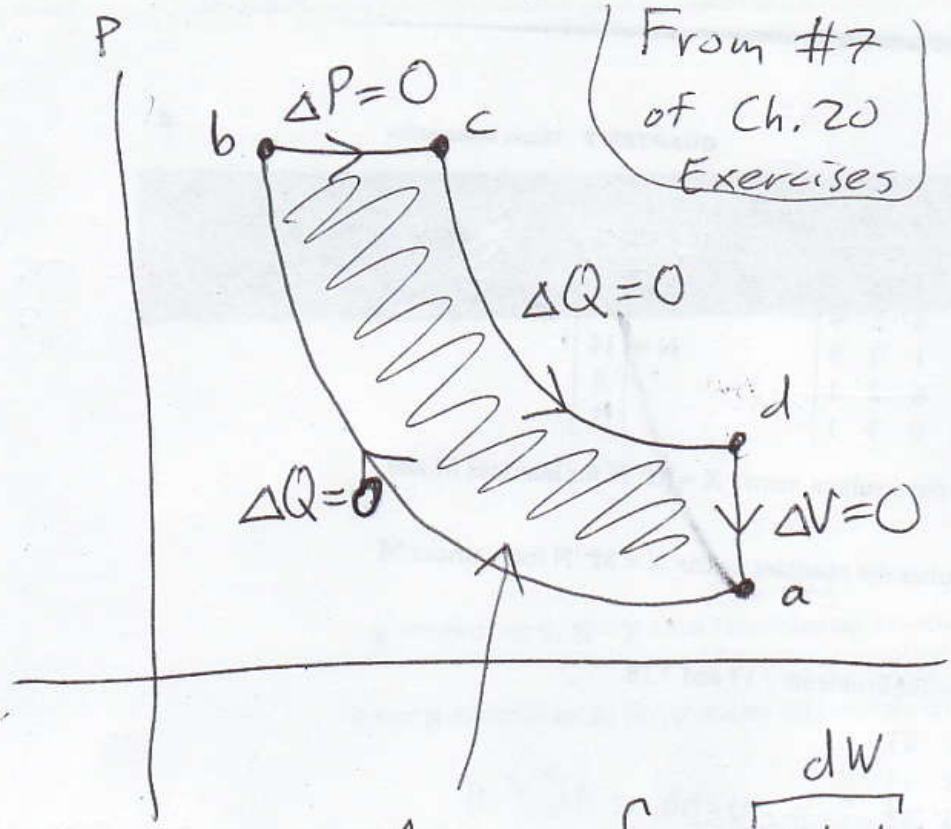
Work: $dW = P\,dV$



expanding gas pushing piston

$dW = F\,dx = \left(\frac{F}{A}\right)(A\,dx) = P\,dV$

$W = \int P\,dV$



From #7 of Ch. 20 Exercises

Diesel Engine

ab: compression
bc: burn & expand
cd: more expansion
da: exhaust

$$\text{Area} = \int_{\text{loop}} \overbrace{P\,dV}^{dW} = \text{work done per cycle}$$