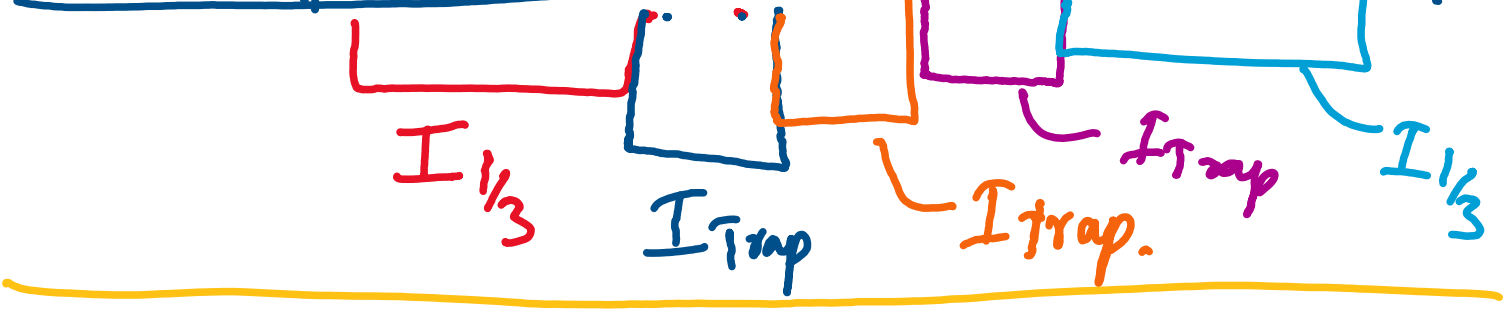
EXAMPLE:

The pressure, P, and the corresponding displacement, x, are given in the table below. If the cross-sectional area, $A = 0.5\ m^2$, then compute the work done

$$W = \int_0^1 P A \, dx$$

x(m)	0	0.1	0.2	0.4	0.5	0.8	0.9	1.0
P (N/m^2)	4	4.23	4.53	5.34	5.88	8.03	8.96	10.0



$$I = I_{1/3} + I_{Trap} + I_{Trap} + I_{Trap} + I_{1/3}$$

$$I = \frac{0.1}{3}\left(4 + 4(4.23) + 4.53\right) + \frac{0.2}{2}\left[4.53 + 5.34\right)$$
$$+ \frac{0.1}{2}\left[5.34 + 5.88\right] + \frac{(0.8-0.5)}{3}(5.88 + 8.03)$$
$$+ \frac{0.1}{3}\left[8.03 + 4(8.96) + 10.0\right]$$

$$I = 3.1393$$