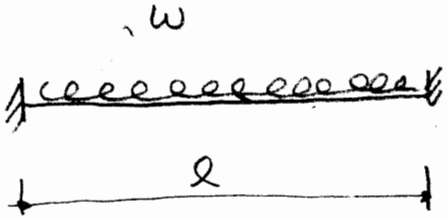
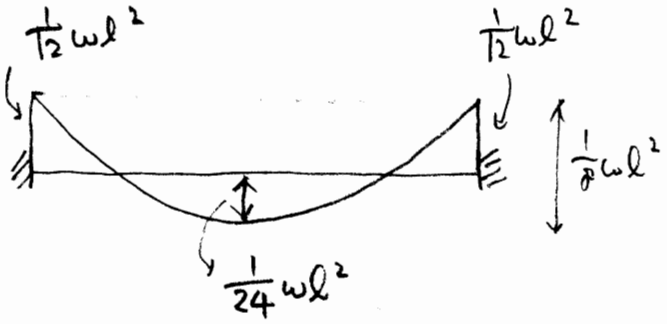
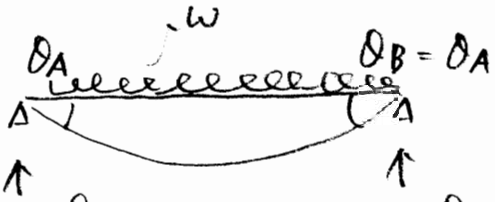
〔H.W.1〕解答.

(1) 固定端モーメントを求める。





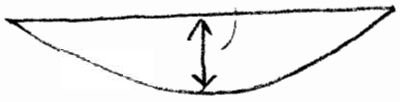
① 単純梁の変形を求めると



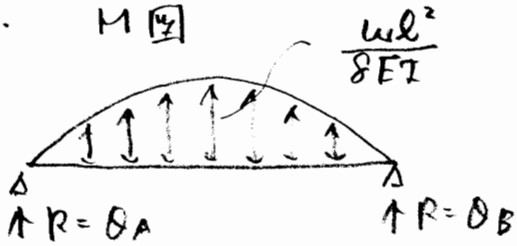
$R = \frac{wl}{2}$　　$R = \frac{wl}{2}$

Q図

$M_0 = \frac{wl^2}{8}$



M図



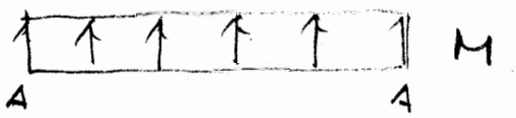
放物線の面積 S は

$S = \frac{2}{3} L \cdot H = \frac{2}{3} \times l \times \frac{wl^2}{8EI}$

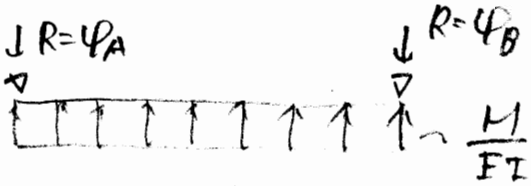
$= \frac{wl^3}{12EI}$

$R = \frac{1}{2} S = \frac{wl^3}{24EI}$

② 両端に曲げモーメント M をかける。



M図



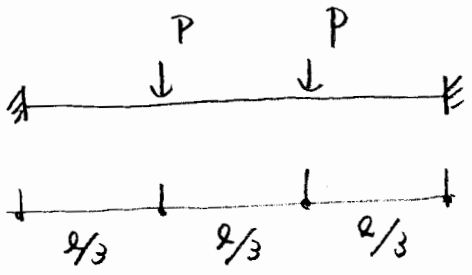
$\varphi_A = \varphi_B = \frac{M}{2EI} \times l$

③ φ_A と θ_A の等しいから

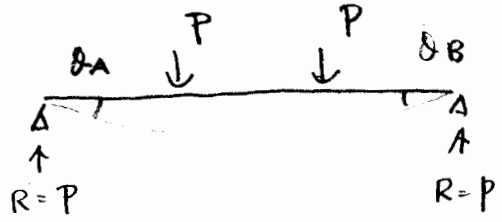
$\frac{wl^3}{24EI} = \frac{Ml}{2EI} \Rightarrow M = \frac{wl^2}{12}$

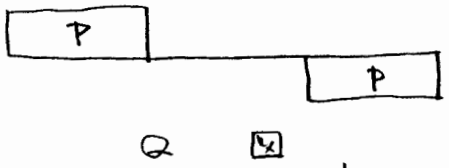
[H.W.1] 解答

(2) 固定端モーメントを求める。

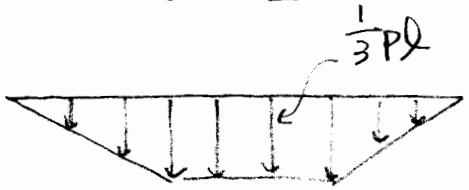


① 単純梁の変形を求めると…



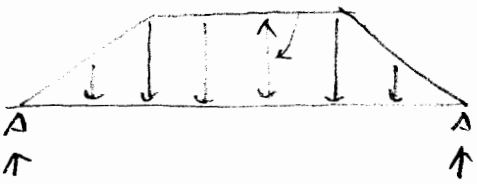


Q 図



M 図

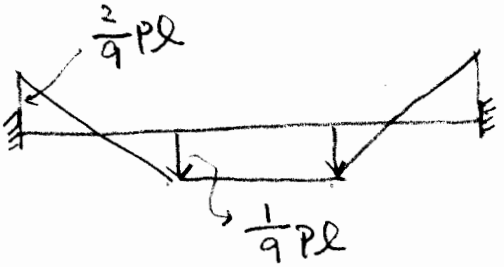
$\frac{P\ell}{3EI} = \omega$



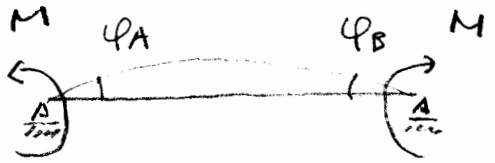
$R = \theta_A$ $R = \theta_B$

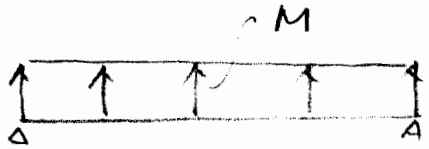
$= \frac{P\ell}{3EI} \times \frac{\ell}{3} \times \frac{1}{2} + \frac{P\ell}{3EI} \times \frac{\ell}{6}$

$= \frac{P\ell^2}{9EI} = \theta_A = \theta_B$

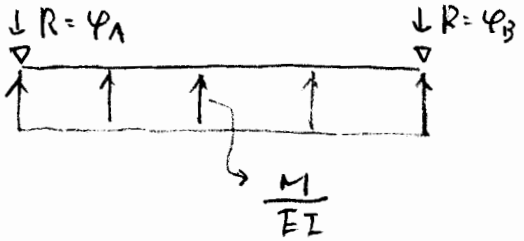


② 両端にモーメントMを加える。





M 図



$\varphi_A = \varphi_B = \frac{M\ell}{2EI}$

③ θ_A と φ_A が等しいためには…

$\frac{P\ell^2}{9EI} = \frac{M\ell}{2EI} \Rightarrow M = \frac{2}{9}P\ell$

答 $M = \frac{2}{9}P\ell$

曲げモーメント図は右上参照。