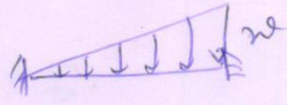
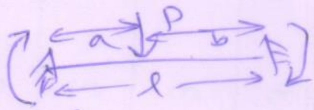
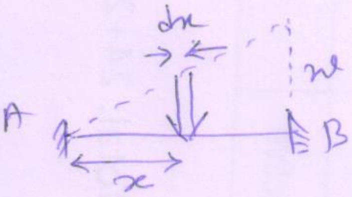
Find the end moments (at the support)



For this we can use the result of the problem



$-\frac{Pab^2}{l^2}$ $\quad$ $\frac{Pba^2}{l^2}$ $\quad$ (+)



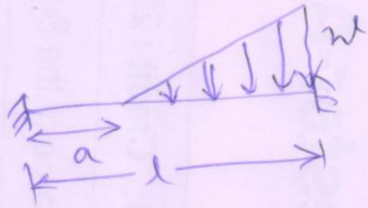
$$\therefore M_A = -\int_0^l \left(\frac{w}{l}x\right)\frac{x(l-x)^2}{l^2}\,dx = -\frac{w}{l^3}\int_0^l (l^2x^2 + x^4 - 2lx^3)\,dx$$

$$\therefore M_A = -\frac{w}{l^3}\left[l^2\frac{x^3}{3} + \frac{x^5}{5} - 2l\frac{x^4}{4}\right]_0^l = -\frac{w}{l^3}\left[\frac{l^5}{3} + \frac{l^5}{5} - \frac{l^5}{2}\right]$$

$$= -\frac{w}{l^3}\left[\frac{10+6-15}{30}\right]l^5 = -\frac{wl^2}{30}$$

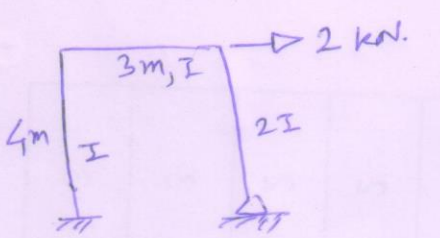
Similarly we can show that $M_B = \frac{wl^2}{20}$.

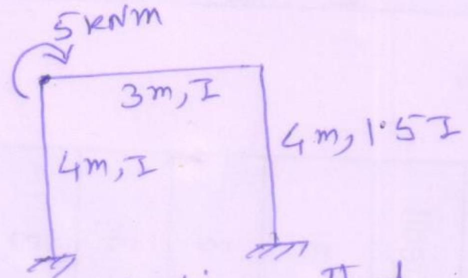
Solve the following problem yourselves



solve

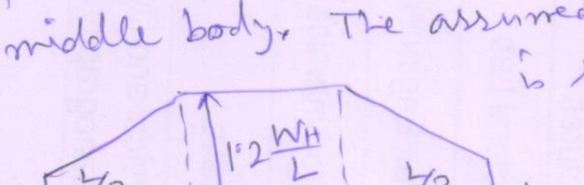
$l = a + b$





solve by moment distribution method.

The weight distribution of a ship is must to calculate the SF and BM at any location of interest. At the preliminary stage of a project, the assessment of the hull weight distribution is commonly made by some methods. Bile's method is one such which is applicable for ships, like general cargo carrier etc., which is having parallel middle body. The assumed hull weight following Bile's method is shown here; where a, b are unknowns, total height $= 1·2\frac{W_H}{L}$ (W_H = hull weight, L = LPP)



Here the ship has $\frac{1}{3}$ of the middle part as parallel middle body. From the location of the LCG, the values of a, b can be estimated.