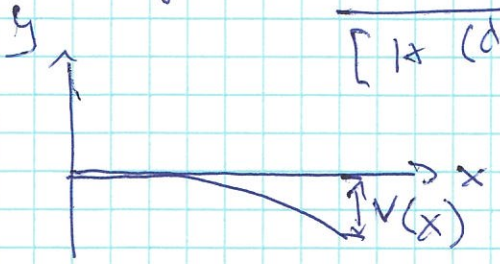
$$\frac{1}{\rho} = \frac{\frac{d^2v}{dx^2}}{\left[1+\left(\frac{dv}{dx}\right)^2\right]^{3/2}} = \frac{M}{EI}$$

FLEXURAL RIGIDITY



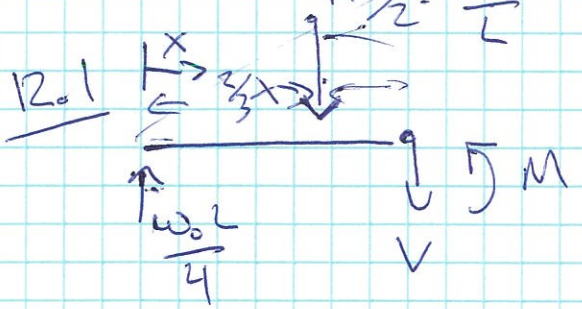
$$\frac{d^2v}{dx^2} = \frac{M}{EI}$$

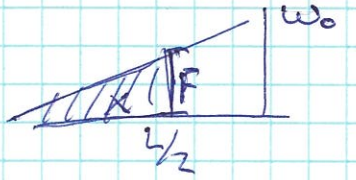
$$EI\frac{dv^2}{dx^2} = M$$

$$EI\,dv^3/dx^3 = V$$

$$EI\,dv^4/dx^4 = w$$

12.1





$$\frac{L/2}{w_0} = \frac{x}{F} \qquad F = \frac{2w_0x}{L}$$

$$\sum M = 0 : M + \frac{x}{3}\left(\frac{w_0x^2}{L}\right) - \frac{w_0Lx}{4}$$

$$\Rightarrow M = \frac{w_0Lx}{4} - \frac{w_0x^3}{3L} = EI\,d^2v/dx^2$$

$$\frac{w_0Lx^2}{8} - \frac{w_0x^4}{12L} + C_1 = EI\,dv/dx$$

$2^6 \cdot 3$

2^5

(1) B.C $dv/dx(L/2) = 0$

$$\Rightarrow 0 = \frac{w_0L}{8}\left(\frac{L}{2}\right)^2 - \frac{w_0}{12L}\left(\frac{L}{2}\right)^4 + C_1$$

$$\Rightarrow 0 = \frac{w_0L^3}{32} - \frac{w_0L^3}{192} \Rightarrow C_1 = w_0L^3\left(\frac{1}{32} - \frac{1}{192}\right)$$

$$C_1 = w_0L^3\left(\frac{6}{192} - \frac{1}{192}\right)$$

$$\Rightarrow \frac{w_0Lx^3}{24} - \frac{w_0x^5}{60L} + \frac{5w_0L^3x}{192} + \cancel{C_2}^{\,0} = VEI \qquad = w_0L^3(5/192)$$

(2) B.C $V(0) = 0 \quad C_2 = 0$

$$EI\,V = \frac{w_0L(L/2)^3}{24} - \frac{w_0(L/2)^5}{60L} + \frac{5w_0L^3(L/2)}{192}$$

$$V = \frac{-w_0L^4}{120EI}$$