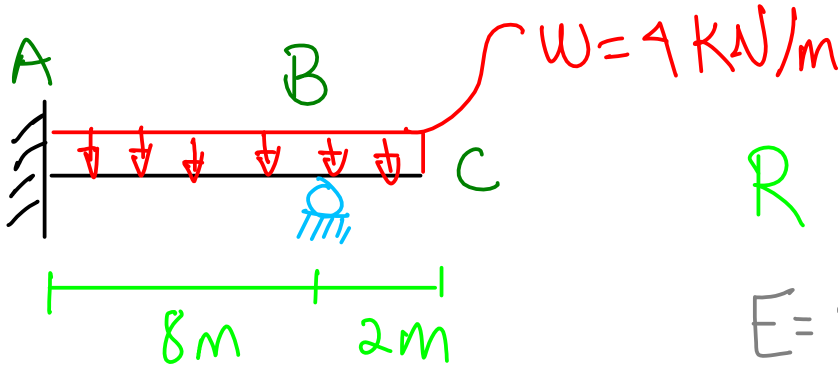
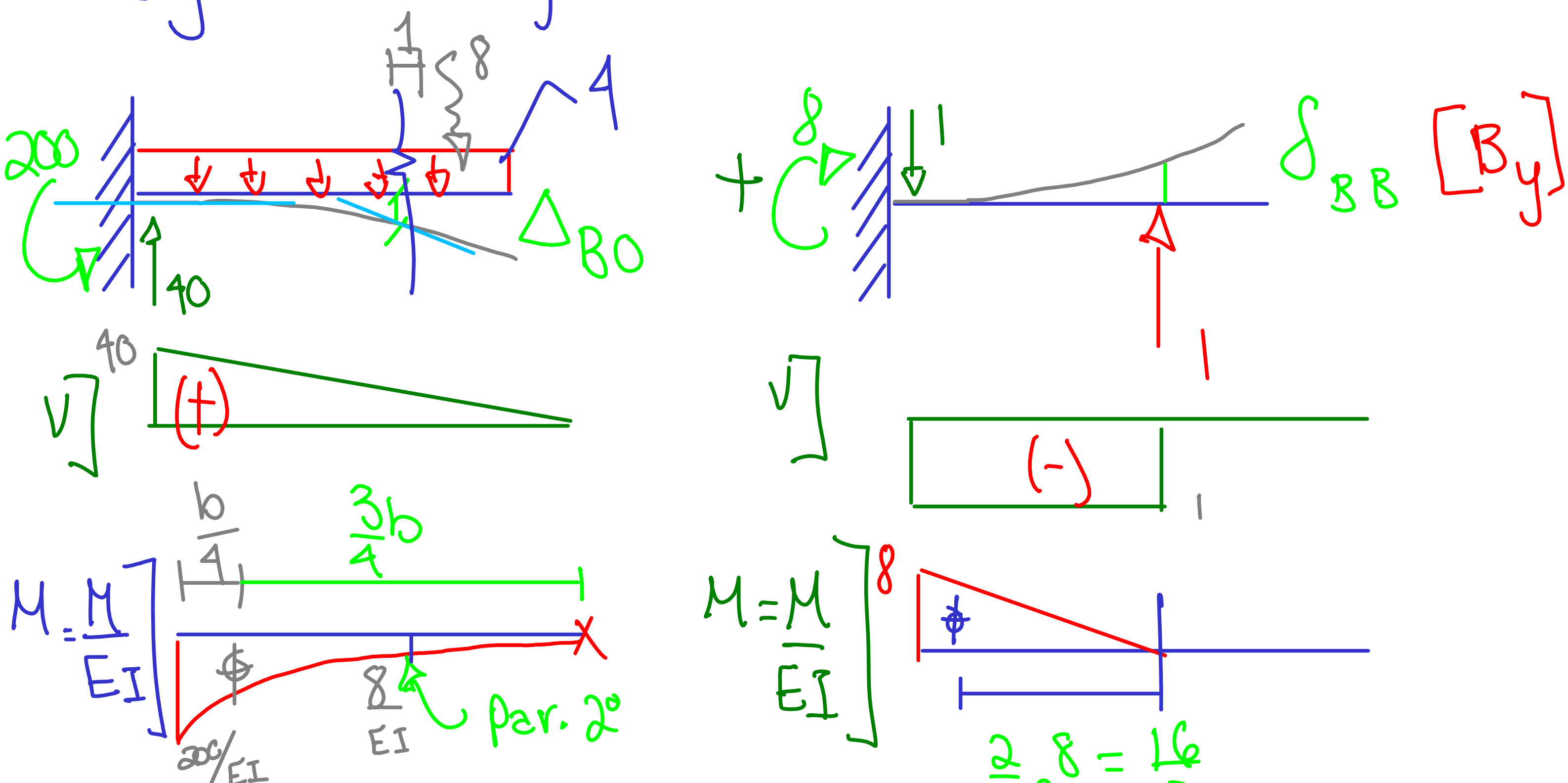


$R,\ V,\ M,\ \delta_c$

$E = 29{,}000 \qquad I = 180$

B_y Será la fuerza redundante



$$\frac{2}{3}\cdot 8 = \frac{16}{3}$$

$$-200 + \frac{1}{2}(10)(40) = 0$$

$$t_{B/A} = \Delta_{BO} = \frac{1}{3}(10)\left(\frac{200}{EI}\right)\left(\frac{3}{4}\cdot 10 - 2\right) - \frac{1}{3}(2)\left(\frac{8}{EI}\right)\left(\frac{1}{4}\cdot 2\right)$$

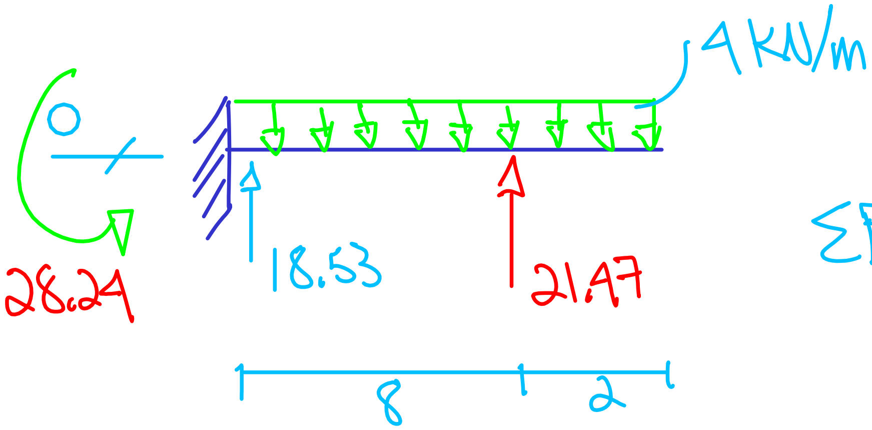
$$= \frac{3664}{EI}$$

$$\delta_{BB} = \frac{1}{2}(8)\left(\frac{8}{EI}\right)\left(\frac{16}{3}\right) = \frac{512}{3EI}$$

Ec. de compatibilidad

$$\Delta_{BO} + \delta_{BB} B_y = 0$$

$$\frac{3664}{EI} - \frac{512}{3EI} B_y = 0 \qquad B_y = \underline{21.47} \text{ kN}$$

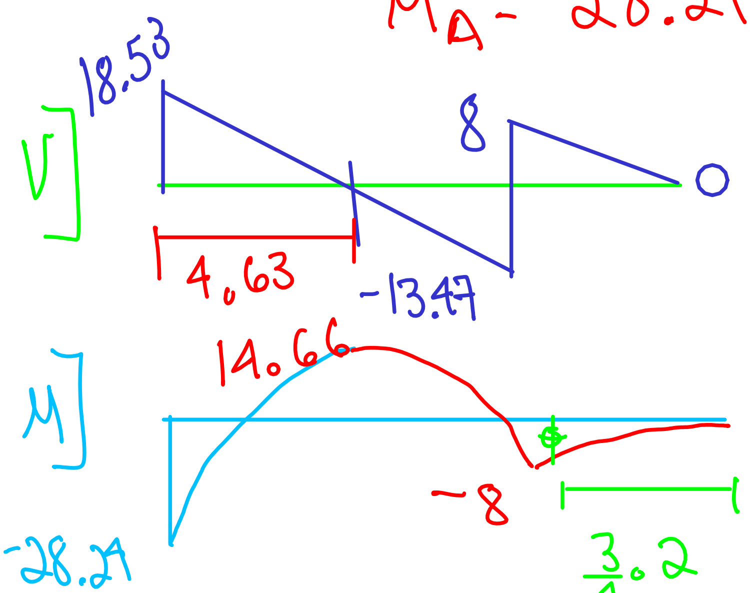


$$\Sigma F_y = -4(10) + 21.47 + A_y = 0$$

$$A_y = 18.53 \text{ kN}$$

$$\Sigma M_A = (4)(10)(5) - 21.47(8) - M_A = 0$$

$$M_A = 28.24$$



$$18.53 - 4(x) = 0$$

$$x = 4.63$$

$$-28.24 + \frac{1}{2}(4.63)(18.53)$$

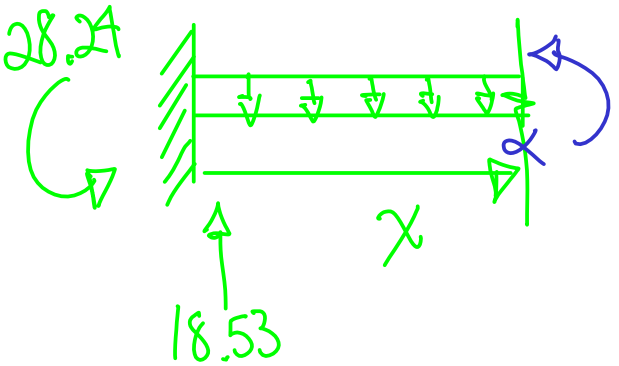
$$= 14.66$$

$$14.66 - \frac{1}{2}(8 - 4.63)(13.47)$$

$$= -8$$

$$* \frac{1}{3}(2)\left(\frac{8}{EI}\right)\left(\frac{3}{4} \cdot 2\right) = 8$$

$$-8 + \frac{1}{2}(2)(8) = 0$$



$$\Sigma M_x = M_x + 28.24 + \frac{4x^2}{2} - 18.53x = 0$$

$$M_x = -2x^2 + 18.53x - 28.24$$

Doble integración

Condiciones de frontera

$\theta_A = 0 \qquad \delta_A = 0$

$$EI\theta \rightarrow \int M(x) \rightarrow \frac{-2x^3}{3} + \frac{18.53x^2}{2} - 28.24x + C_1$$

$$0 + 0 + 0 + C_1 = 0$$

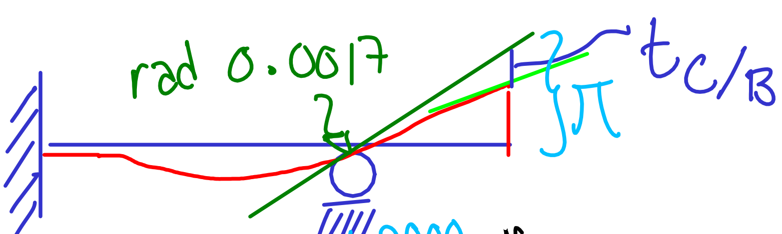
Si $x = 0;\ \theta = 0 \therefore C_1 = 0$

$$EI\theta = \frac{-2x^3}{3} + \frac{18.53x^2}{2} - 28.24x$$

Rotación en B

$$EI\theta_{(8\,m)} = \frac{-2(8)^3}{3} + \frac{18.53(8)^2}{2} - 28.24(8) = 25.7$$

$$\theta_{8m} = \frac{25.7\,kNm^2}{EI} = \frac{25.7\,kNm^2}{29000\,ksi \cdot 180\,in^4} = 0.0017\ rad$$



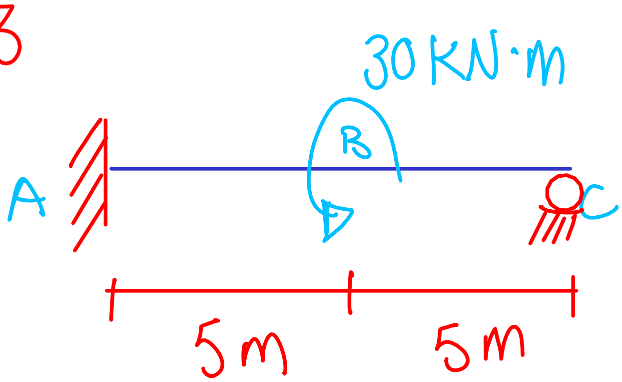
$$t_{C/B} = \frac{8}{EI} = \frac{8\,kNm^3}{29000\,ksi \cdot 180\,in^4} = 0.534\,mm$$

$\pi = (0.0017 rad)(2000 mm) = 3.4 mm$

$\tan\theta \approx \theta$

$\delta_C = 3.4 mm - 0.534 mm = 2.866 mm$

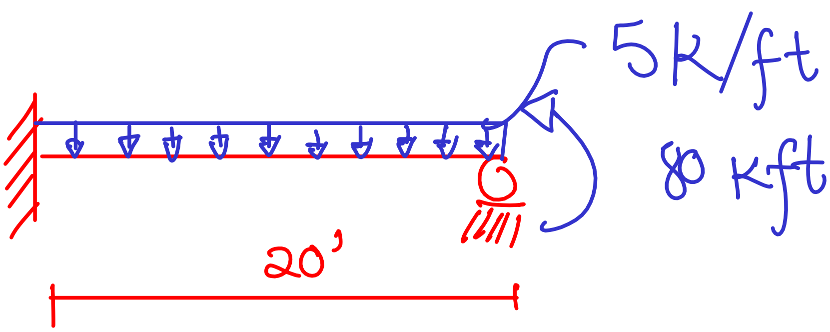
11.3



R, V, M

EI = cte

11.4



R, V, M

EI = cte.