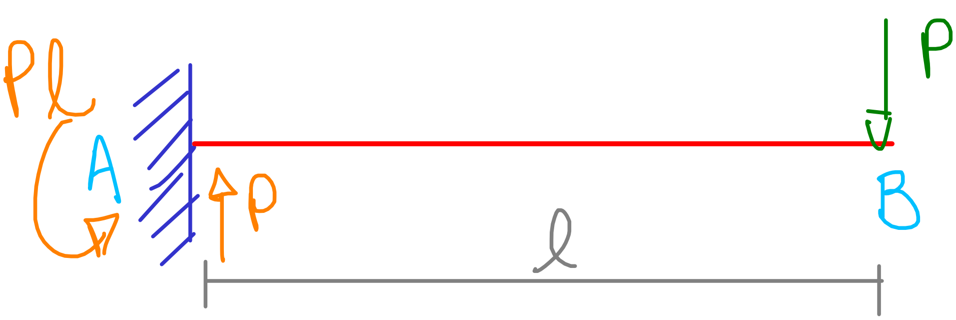
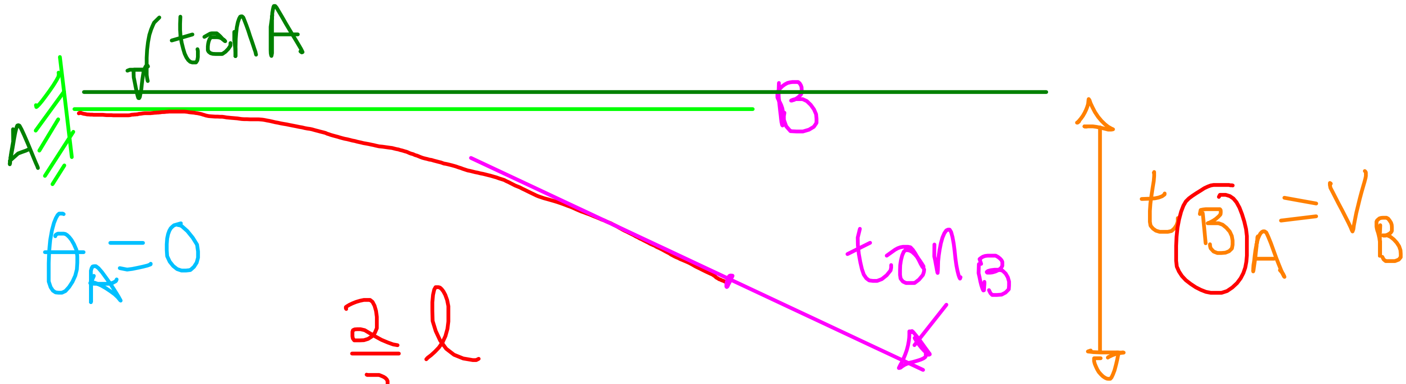
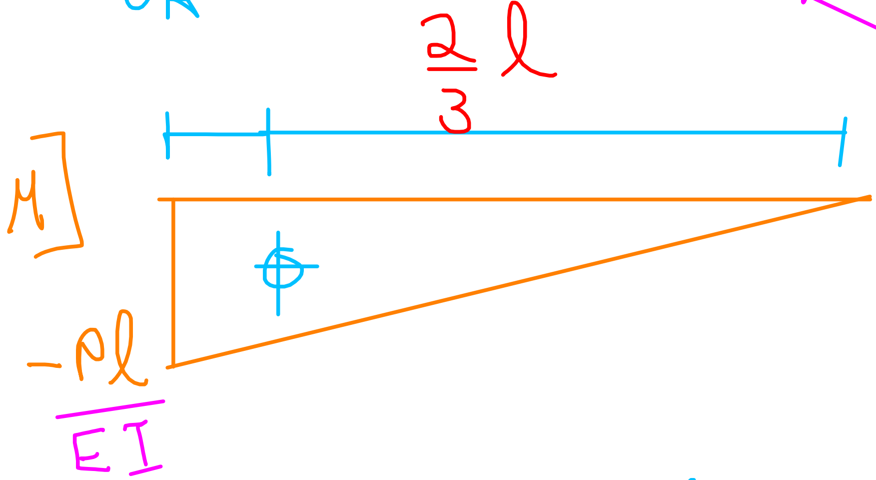
θ_B

Calcule la pendiente teta.b y la deflexión vb en el extremo de la viga en voladizo. EI es constante.

V_B







$$\Delta\theta_{AB} = \int_A^B \frac{M}{EI}\,dx$$

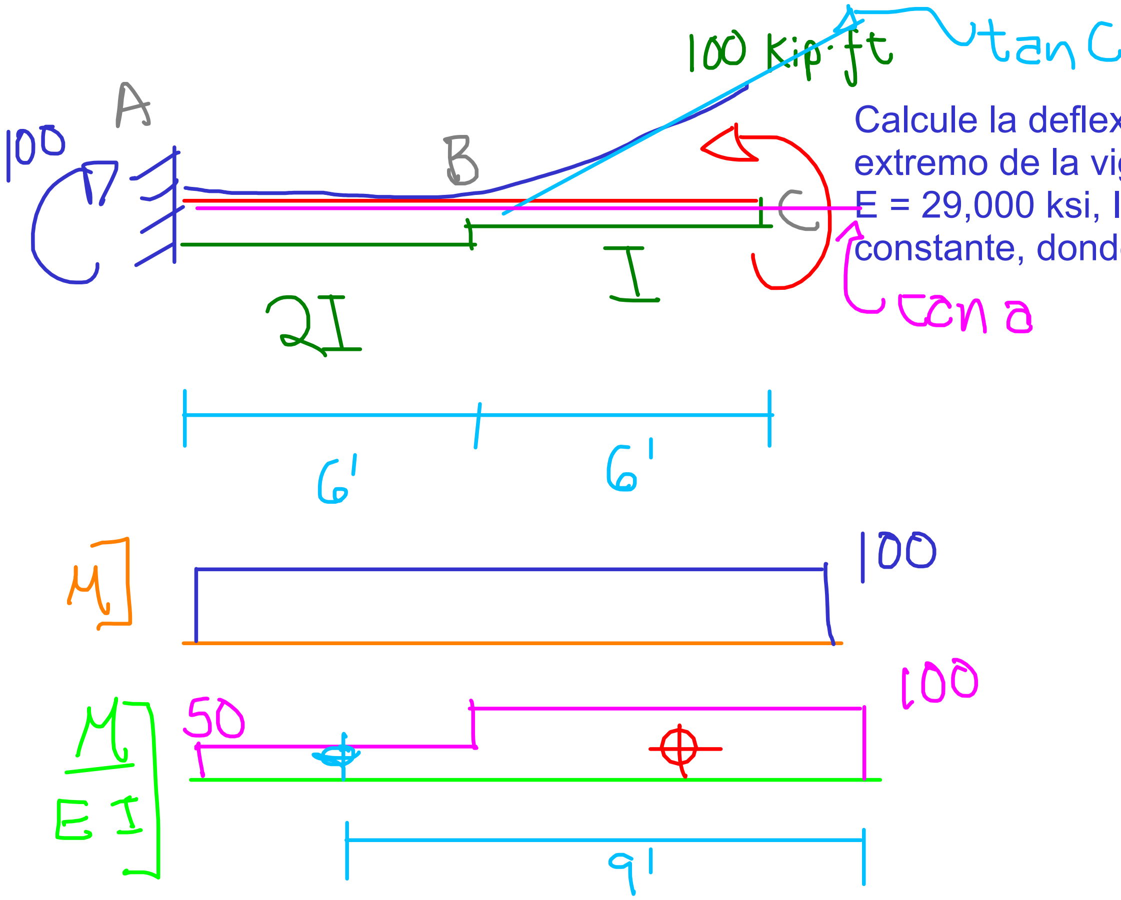
$$\theta_B = \theta_A + \Delta\theta_{AB}$$

$$\Delta\theta_{AB} = \theta_B = \frac{1}{2} l \left(\frac{-Pl}{EI}\right) = \frac{-Pl^2}{2EI}$$

Rotación en B

$$t_{BA} = \int_A^B \frac{Mx}{EI}\,dx$$

$$t_{BA} = V_B = \frac{1}{\cancel{2}}(l)\left(\frac{-Pl}{EI}\right)\left(\frac{\cancel{2}}{3} l\right) = -\frac{Pl^3}{3EI}$$



Calcule la deflexión del punto C en el extremo de la viga en voladizo, si E = 29,000 ksi, I.ab = 2I; I.bc = I; E = constante, donde I = 400 in⁴.

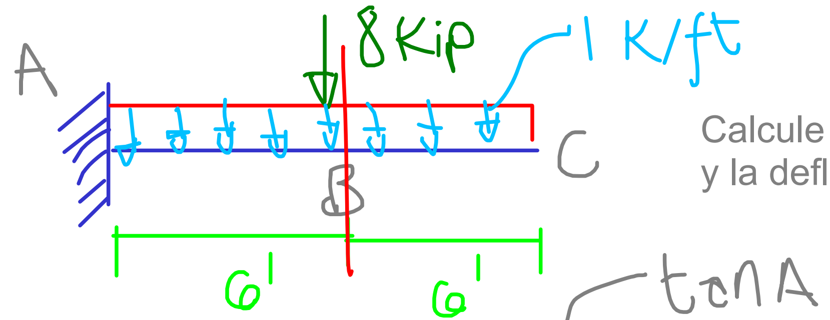
$$V_C = t_{CA} = \frac{50}{EI}(6)(9') + \frac{100}{EI}(6)(3') = \frac{4500}{EI}$$

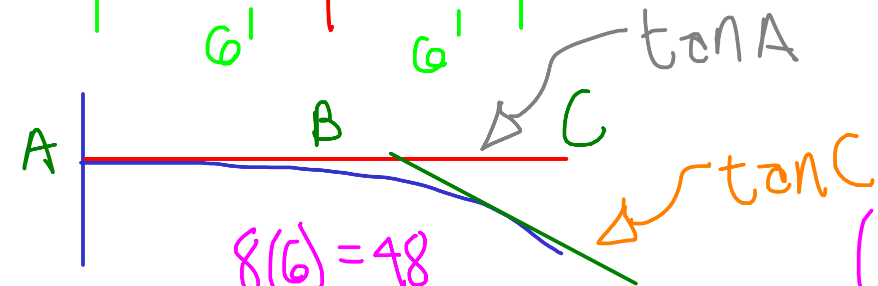
Kip ft · ft · ft

$$\left|ft^3\right|\left(\frac{12\,in}{1\,ft}\right)^3\Big| \rightarrow 12^3 = 1728\,in^3$$

$$V_C = \frac{4500(1728)}{29000\,(400)} = \underline{\underline{0.67\,in}}$$

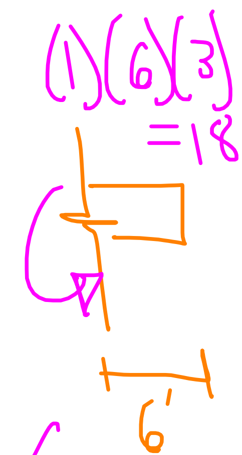
Calcule la pendiente de la curva elástica en B y C; y la deflexión en C para la viga en voladizo.

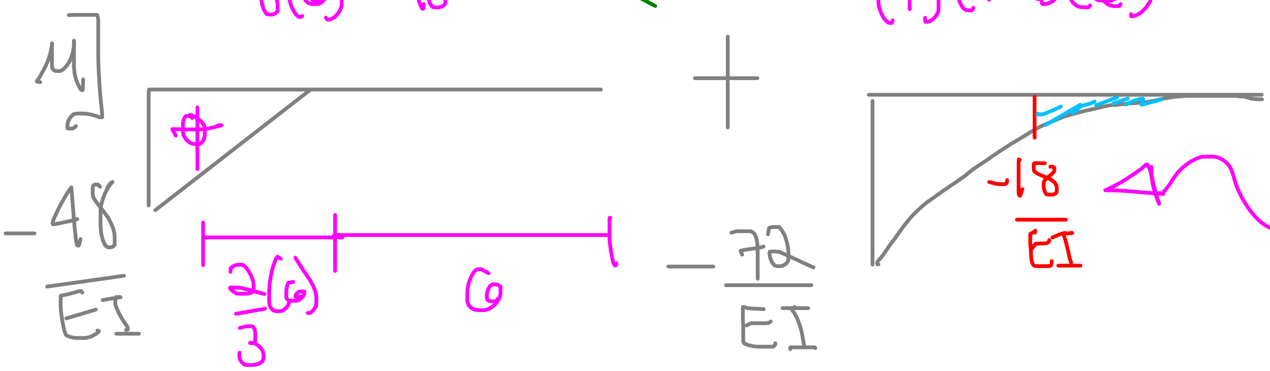




$8(6) = 48$

$(1)(12)(6) = 72$





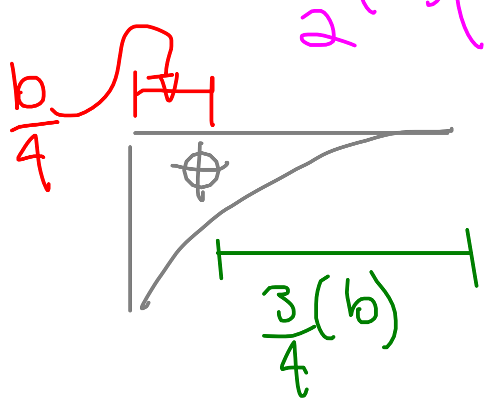
$$\theta_C = \theta_A + \Delta\theta_{AC}$$

$$= 0 + \frac{1}{2}(6)\left(-\frac{48}{EI}\right) + \frac{1}{3}(12)\left(-\frac{72}{EI}\right) = -\frac{432}{EI}\ \text{rad}$$

$$\theta_B = \theta_C - \frac{1}{3}(6')\left(\frac{-18}{EI}\right) =$$

$$-\frac{432}{EI} + \frac{1}{3}(6')\frac{(18)}{EI} = \frac{-396}{EI} = \theta_B$$

$$V_C = \frac{1}{2}(6)\left(-\frac{48}{EI}\right)(10') + \frac{1}{3}(12)\left(-\frac{72}{EI}\right)(9')$$



$b = 12 \rightarrow \frac{3}{4}(12) = 9'$

$$= -\frac{4032}{EI}$$