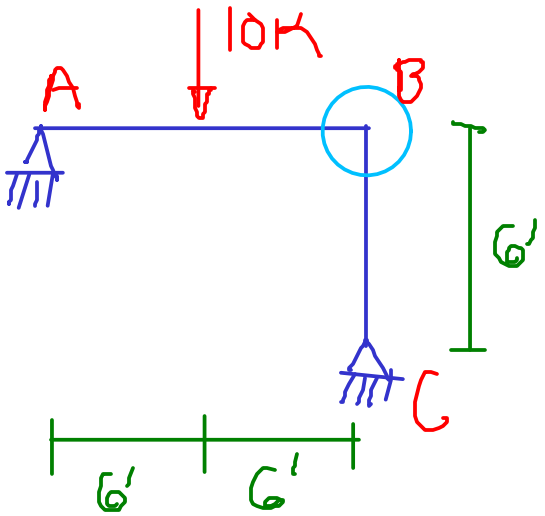
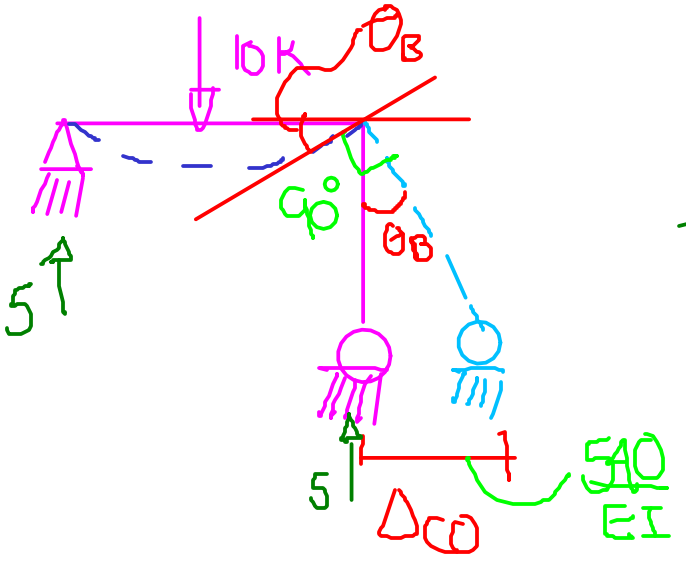
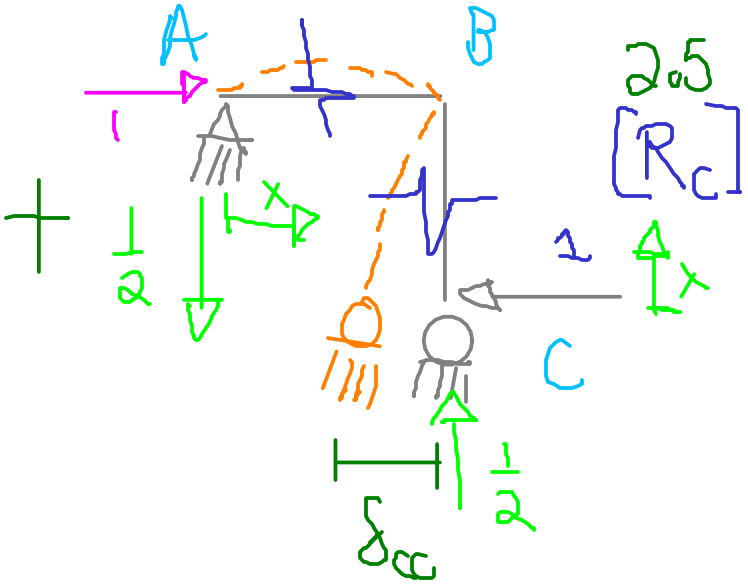


Ec. de compatibilidad

$$\Delta_{C0} + \delta_{CC} R_C = 0$$





$$\theta_B = \frac{PL^2}{16EI} = \frac{(10)(12)^2}{16EI} = \frac{90}{EI}$$

$$1\delta_p = \sum \frac{M_Q M_P}{EI}$$

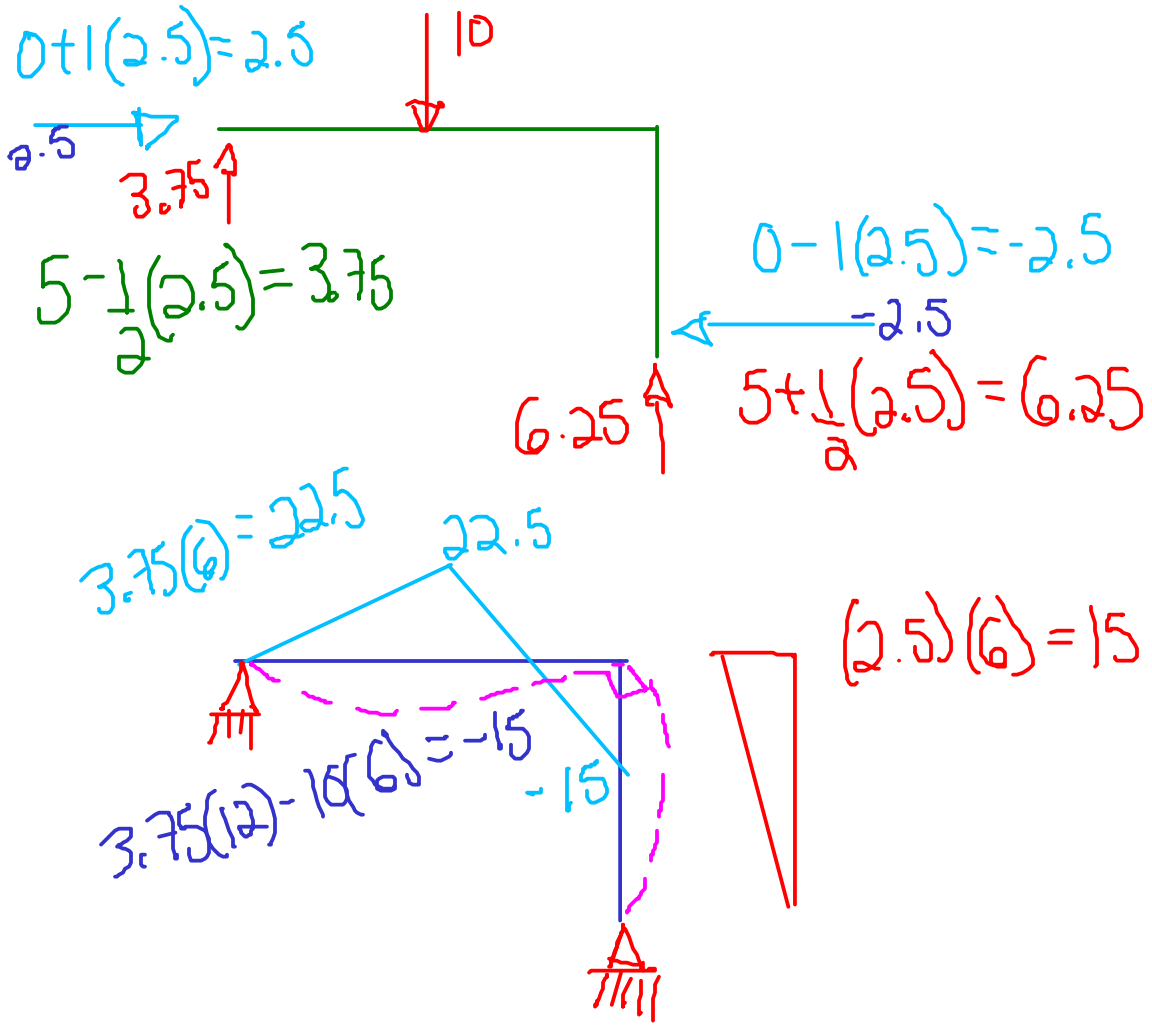
$$\Delta_{C0} = \theta_B h = \frac{90}{EI}(6) = \frac{540}{EI}$$

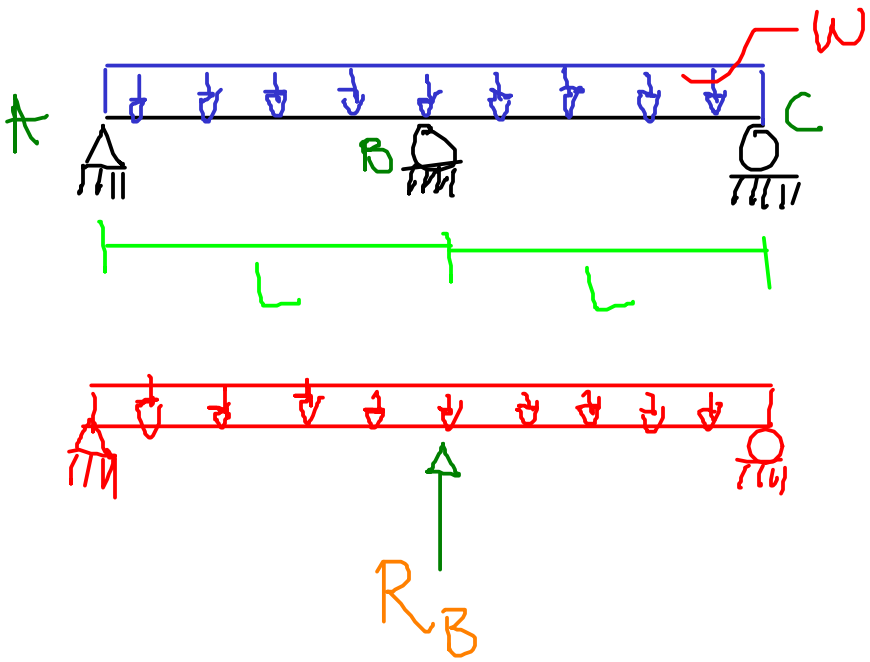
$$EI\,\delta_{CC} = \int_0^{12} \left(\frac{1}{2}x\right)\left(\frac{1}{2}x\right)dx + \int_0^6 x\,x\,dx$$

$$\frac{x^3}{12}\Big|_0^{12} + \frac{x^3}{3}\Big|_0^6 = 144 + 72 = \underline{216}$$

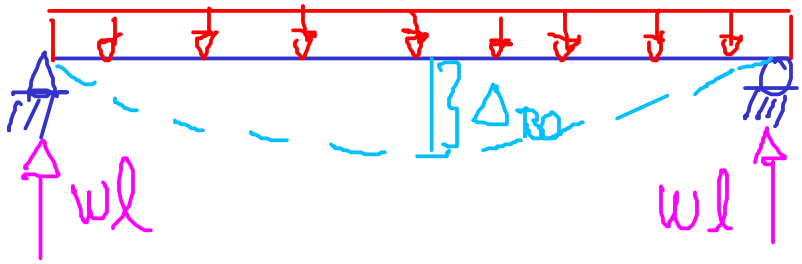
$$\delta_{CC} = \frac{216}{EI}$$

$$-\frac{540}{EI} + \frac{216}{EI} R_C = 0 \rightarrow R_C = 2.5\,k\ (\leftarrow)$$





$$\Delta_B = 0$$



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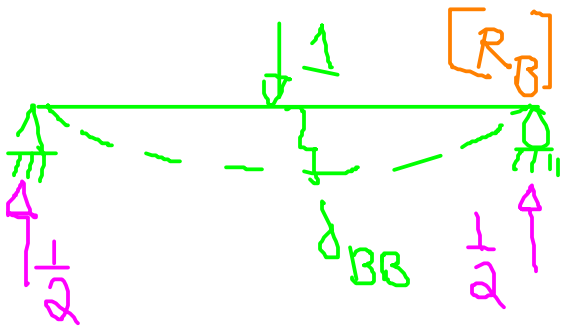


Ec. de compatibilidad

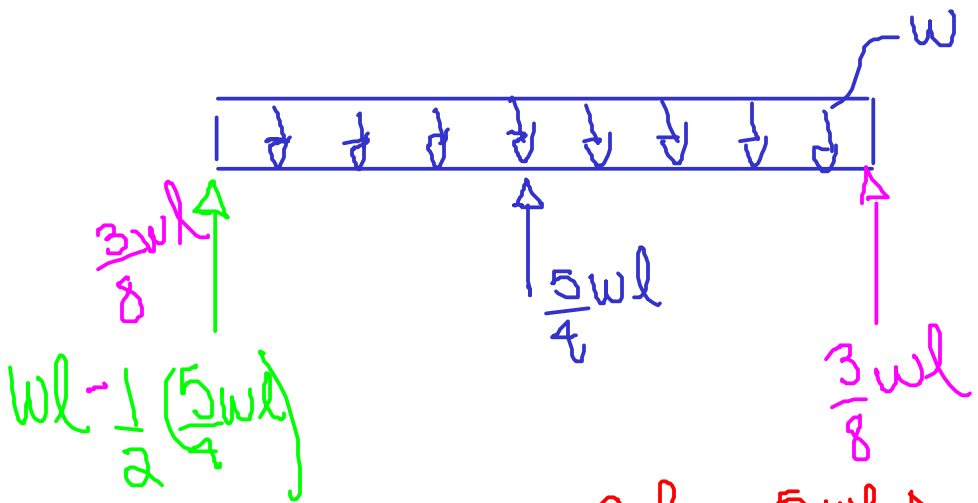
$$\Delta_{BO} + \delta_{BB} R_B = 0$$

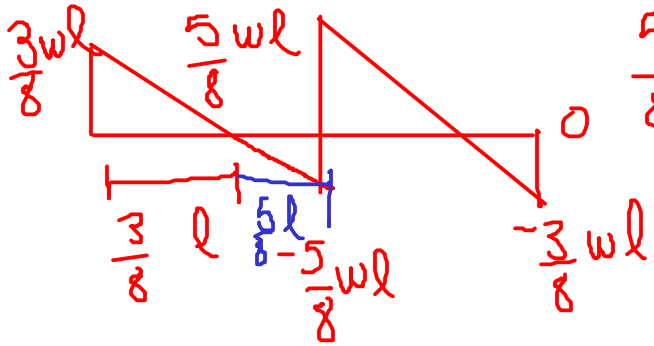
$$\Delta_{BO} = \frac{5wl^4}{384EI} = \frac{5w(2l)^4}{384EI} = \frac{5wl^4}{24EI}$$

$$\delta_{BB} = \frac{Pl^3}{48EI} = \frac{1(2l)^3}{48EI} = \frac{l^3}{6EI}$$

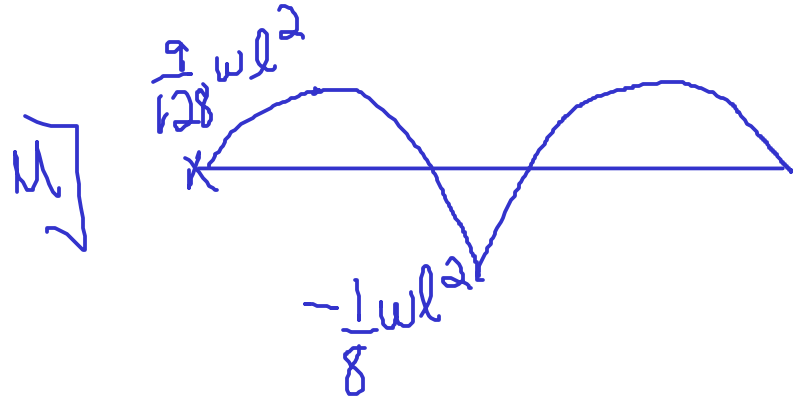
$$\frac{5wl^4}{24EI} + \frac{l^3}{6EI}[R_B] = 0 \rightarrow R_B = \frac{5}{4}wl$$

$\therefore (\uparrow)$





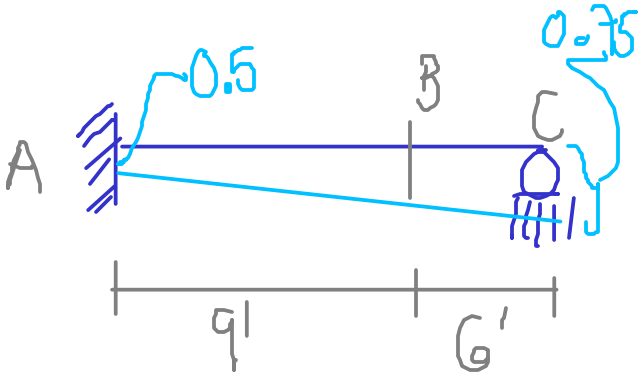
$\frac{5}{8}wl - wl = -\frac{3}{8}wl$



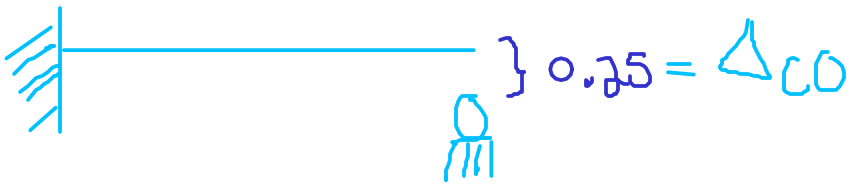
$$\left(\frac{1}{2}\right)\left(\frac{3}{8}wl\right)\left(\frac{3}{8}l\right)=\frac{9}{128}wl^2$$

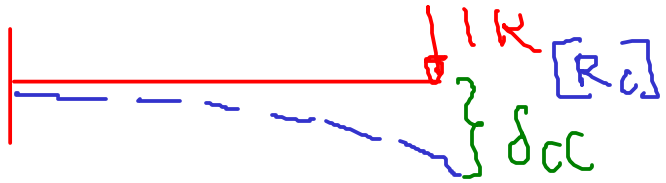
$$\frac{9}{128}wl^2-\frac{1}{2}\left(\frac{5}{8}l\right)\left(\frac{5wl}{8}\right)$$

$$\frac{9}{128}wl^2-\frac{25}{128}wl^2=-\frac{1}{8}wl^2$$



Asumiendo que ninguna carga actúa, calcule las reacciones y dibuje los diagramas de corte y momento para la viga mostrada, si el soporte A se asienta 0.5 in, y el soporte C se asienta 0.75 in. E = 29,000 ksi; I = 150 in⁴.





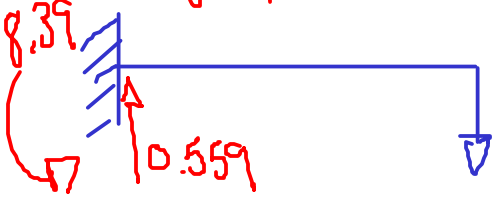
$$\Delta_{co}+\delta_{cc}R_c=0$$

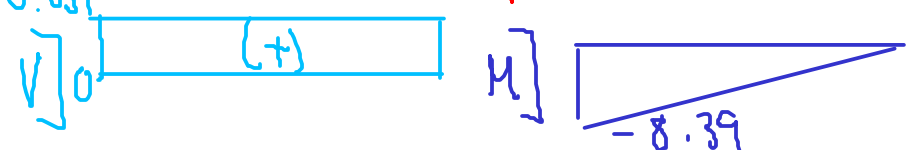
$$\delta_{cc}=\frac{Pl^3}{3EI}=\frac{(1)\,15^3\,(12^3)}{3\,(29{,}000)(150)}=0.447\text{ in}\downarrow$$

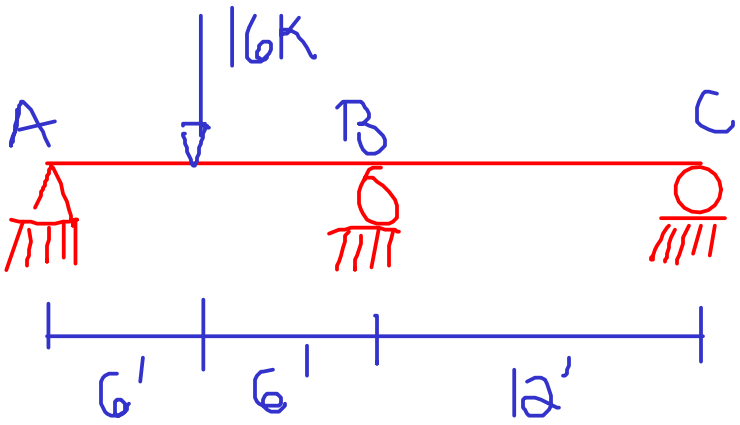
$$0.25+0.447R_c=0$$

$$R_c=0.559\text{ kip}$$

0.559(15) = 8.39

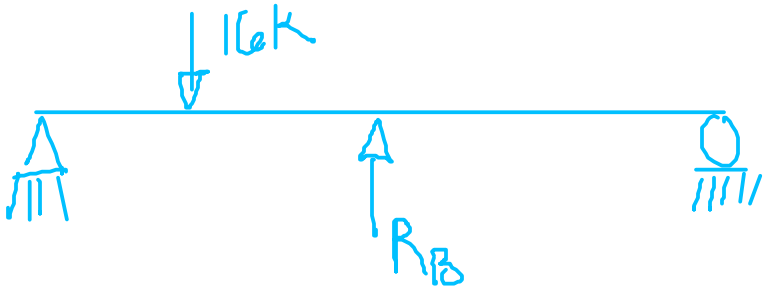






Calcule las reacciones de la viga mostrada, asumiento que los apoyos no se mueven. EI = constante.

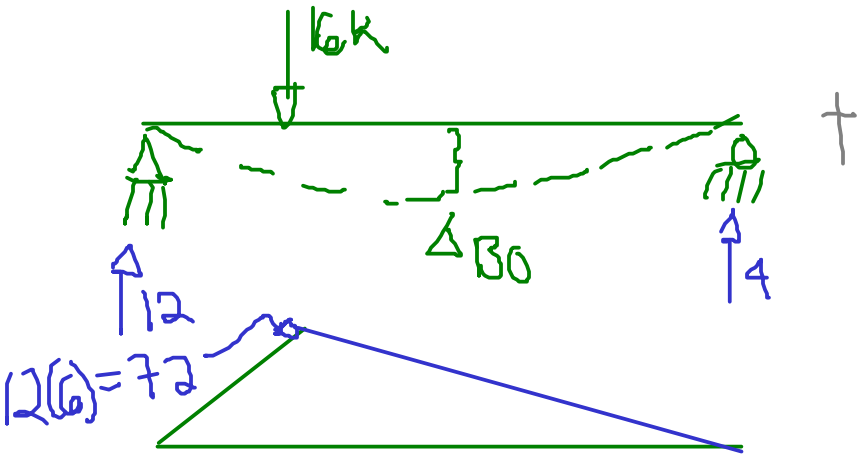
Repita los cálculos suponiendo que el apoyo C se mueve hacia arriba una distancia de 288/EI cuando se aplica la carga.



$$\Sigma M_A = 0 = 16(6) - R_C(24)$$

$$R_C = 4$$

=



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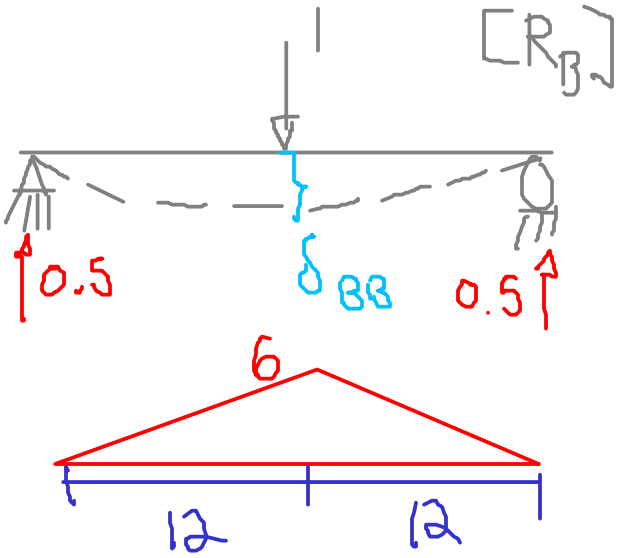
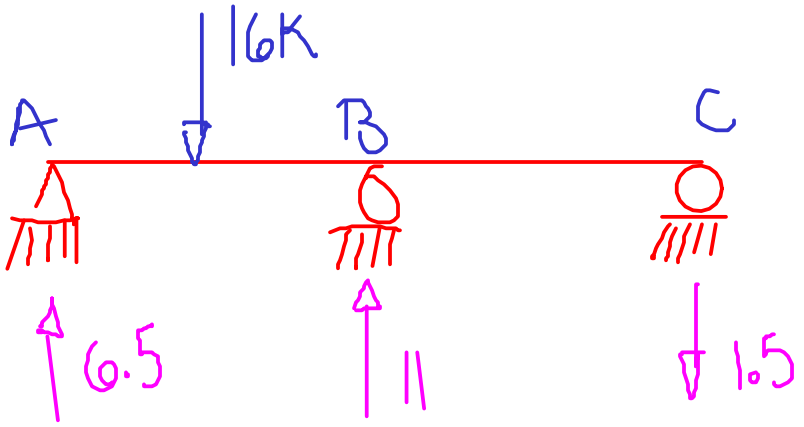


$$\Delta_{BO} + \delta_{BB} R_B = 0$$

$$\Delta_{BO} = \left(\frac{1}{3} - \frac{(12-6)^2}{6(12)(18)}\right)\left(\frac{72}{EI}\right)\left(\frac{6}{EI}\right)24 = \frac{3168}{EI} \quad (\downarrow)$$

$$\delta_{BB} = \frac{PL^3}{48EI} = \frac{(1)(24)^3}{48EI} = \frac{288}{EI} \uparrow$$

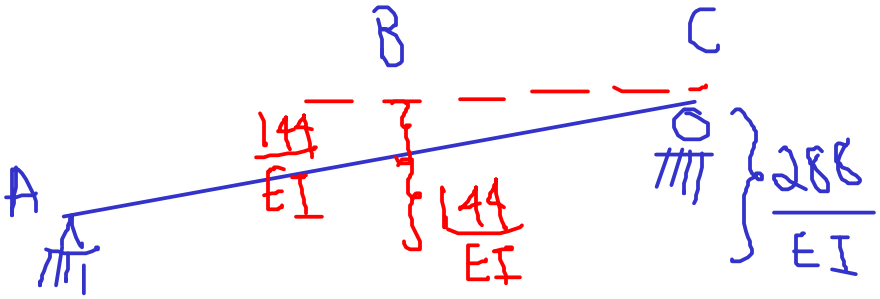
$$-\frac{3168}{EI}+\frac{288}{EI}R_B=0 \rightarrow R_B=11\ \text{kip}\uparrow$$



$$\Sigma M_A=0=16(6)-11(12)-R_C(24)$$

$$\rightarrow R_C=1.5\downarrow$$

$$\Sigma F_y=16+1.5-11-A=0 \rightarrow A=6.5$$



$$\Delta_{B0}+\delta_{BB}R_B=-\frac{144}{EI}$$

$$\frac{-3168}{EI}+\frac{288}{EI}R_B=-\frac{144}{EI}$$

$$R_B=10.5\ \text{kip}\uparrow$$

$$R_A=6.75\text{K}\uparrow \qquad R_C=1.25\downarrow$$