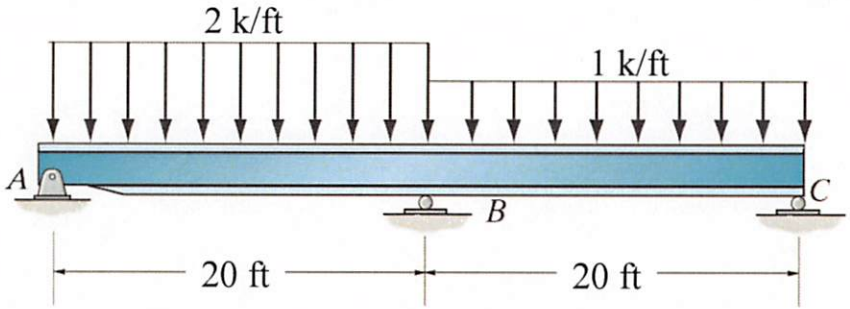
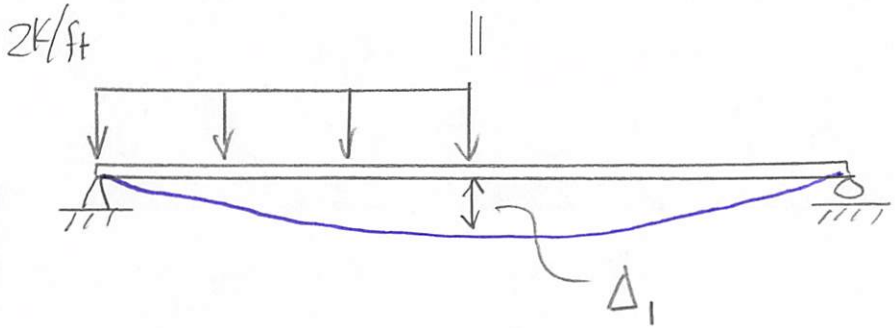
Problem 9a-3 – Compute the reactions and draw the shear and moment curves for the following beam.



$$\Delta_B = 0 = \Delta_1 + \Delta_2 + B_y f_{BB}$$



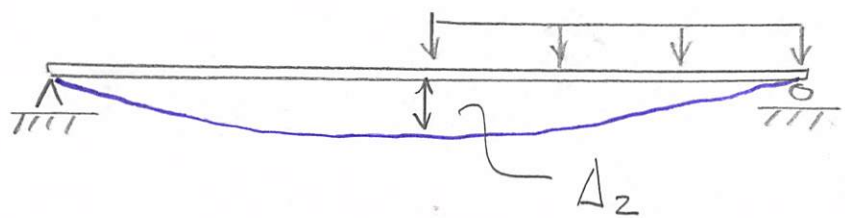
$$\Delta_1 = -\frac{WX}{384EI}\left[16x^3 - 24Lx^2 + 9L^3\right]$$

$$= -\frac{(2k/ft)(20')}{384EI}\left[16(20')^3 - 24(40')(20')^2 + 9(40')^3\right]$$

$$= -\frac{33{,}333.3\ k\,ft^3}{EI}$$

+

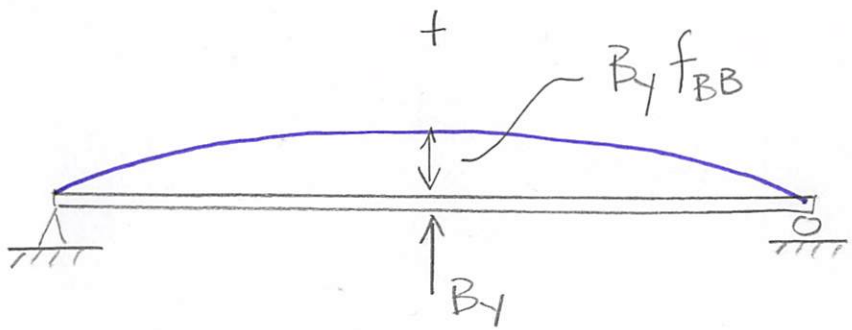
1k/ft



$$\Delta_2 = \Delta_1/2 = -\frac{16{,}666.6\ k\,ft^3}{EI}$$

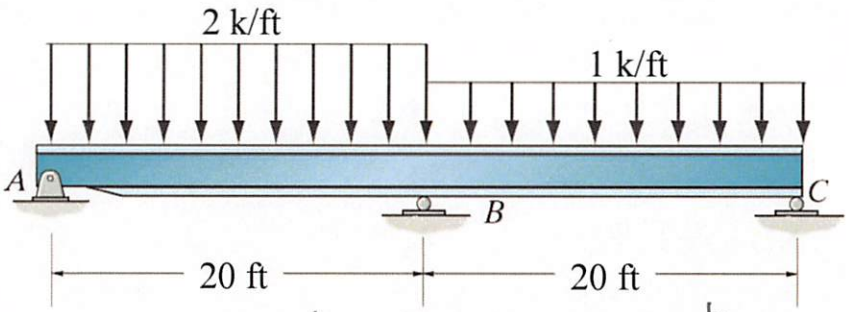
$$f_{BB} = \frac{L^3}{48EI} = \frac{(40')^3}{48EI} = \frac{1{,}333.3\ ft^3}{EI}$$

+



$$B_y = \frac{\Delta_1 + \Delta_2}{f_{BB}} = \underline{37.5k}$$

Problem 9a-3 – Compute the reactions and draw the shear and moment curves for the following beam.

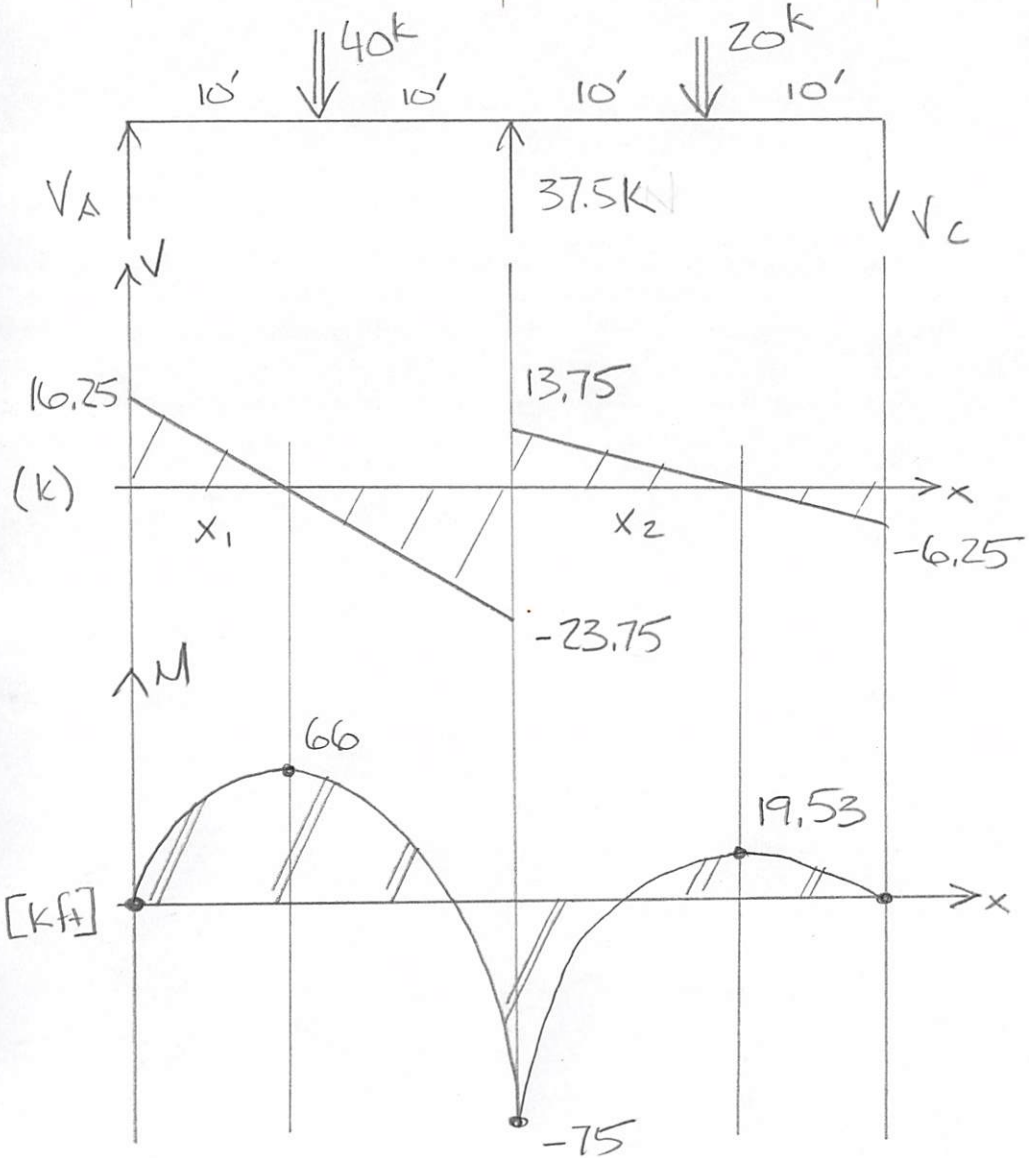


$\circlearrowleft + \sum M_C = 0 = 20^k(10') + 40^k(30') - 37.5k(20') - V_A(40')$

$$V_A = 16.25k$$

$+\uparrow \sum F_y = 0 = V_A + 37.5k - V_C - 40^k - 20^k$

$$V_C = -6.25k$$



$$x_1 = \frac{16.25k}{2k/ft} = 8.125\,ft$$

$$x_2 = \frac{13.75k}{1k/ft} = 13.75\,ft$$

$$M_{MAX} = -75\,kft\ @\ B$$