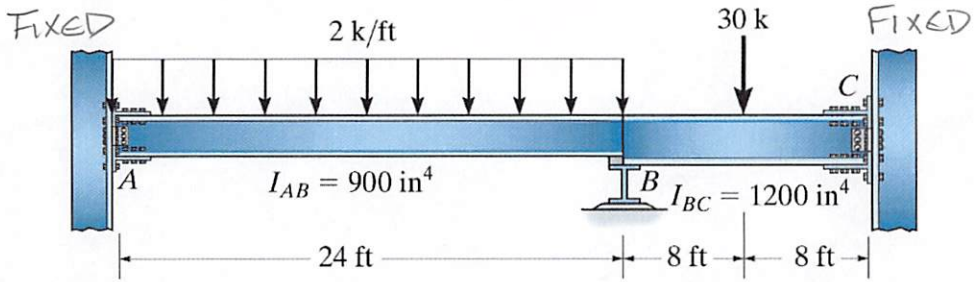
Problem 11a-3 – Determine the moments at *A*, *B*, and *C*, then draw the moment diagram for the beam. The moment of inertia of each span is indicated in the figure. Assume the support at *B* is a roller and *A* and *C* are fixed. $E = 29(10^3)$ ksi.



$$FEM_{AB} = \frac{WL^2}{12} = \frac{2k/ft(24ft)^2}{12} = \pm 96k\,ft$$

$$FEM_{BC} = \frac{PL}{8} = \frac{30^k(16ft)}{8} = \pm 60k\,ft$$

$DF_{AB} = DF_{CB} = 0$

$I_{BC} = 4/3\ I_{AB}$

$$K_{BA} = \frac{4EI_{AB}}{L_{AB}} \qquad K_{BC} = \frac{4E(4/3\,I_{AB})}{L_{BC}}$$

$$= 4/24 \qquad = 1/3$$

$$DF_{BA} = \frac{K_{BA}}{K_{BA} + K_{BC}} = \frac{4/24}{4/24 + 1/3} = 1/3$$

$DF_{BC} = 2/3$

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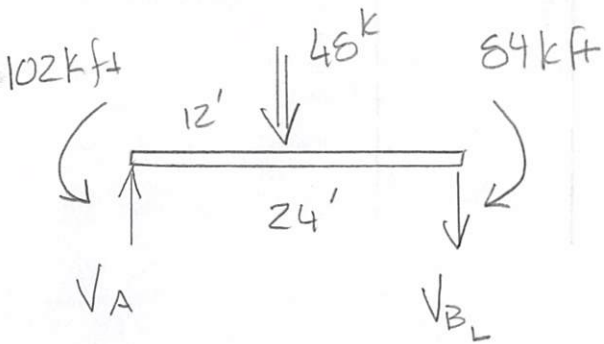
JOINT	A	B		C
MEMBERS	AB	BA	BC	CB
DF	0	1/3	2/3	0
FEM	-96	96	-60	60
DIST		-12	-24	
CO	-6			-12
DIST				
Σ	-102	84	-84	48 kft

FBD AB



$\circlearrowleft + \Sigma M_B = 0 = 102\,kft - 84\,kft + 48k(12') - V_A(24')$

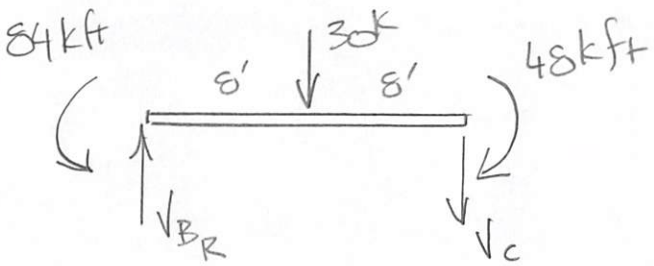
$V_A = 24.75\,k$

$+\uparrow \Sigma F_y = 0 = V_A - V_{B_L} - 48k$

$V_{B_L} = -23.25\,k$

Problem 11a-3 – Determine the moments at *A*, *B*, and *C*, then draw the moment diagram for the beam. The moment of inertia of each span is indicated in the figure. Assume the support at *B* is a roller and *A* and *C* are fixed. $E = 29(10^3)$ ksi.

SECTION BC



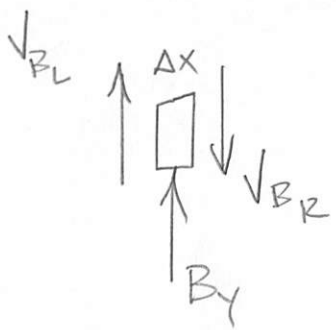
$$\circlearrowleft + \Sigma M_B = 0 = 84k\text{ft} - 48k\text{ft} - 30^k(8') - V_C(16')$$

$$V_C = -12.75^k$$

$$+\uparrow \Sigma F_y = 0 = V_{B_R} - V_C - 30^k$$

$$V_{B_R} = 17.25^k$$

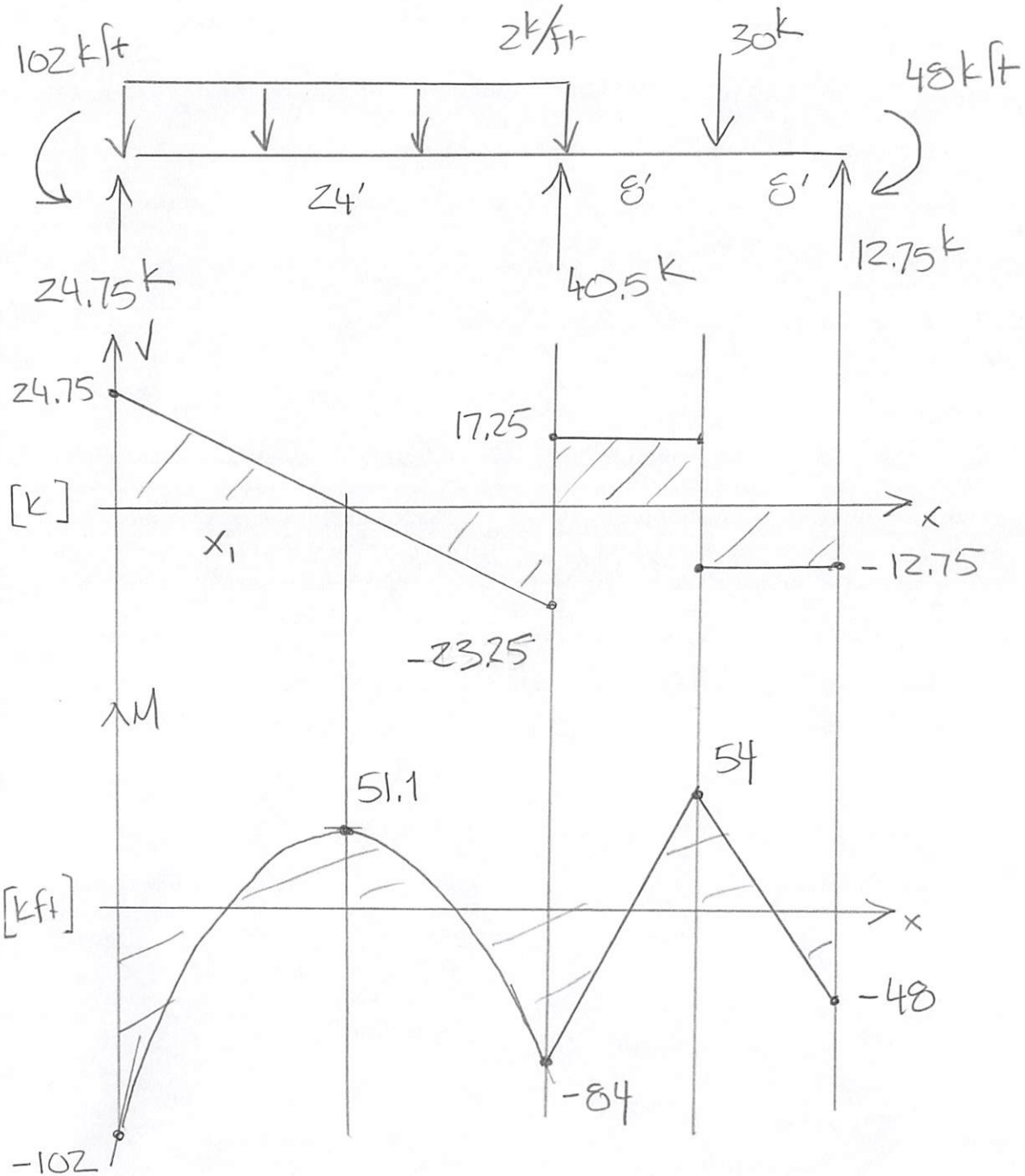
JOINT B



$$+\uparrow \Sigma F_y = 0 = V_{B_L} - V_{B_R} + B_y$$

$$B_y = 40.5$$

Problem 11a-3 – Determine the moments at *A*, *B*, and *C*, then draw the moment diagram for the beam. The moment of inertia of each span is indicated in the figure. Assume the support at *B* is a roller and *A* and *C* are fixed. $E = 29(10^3)$ ksi.



$$x_1 = \frac{24.75\,k}{2\,k/ft} = 12.38'$$