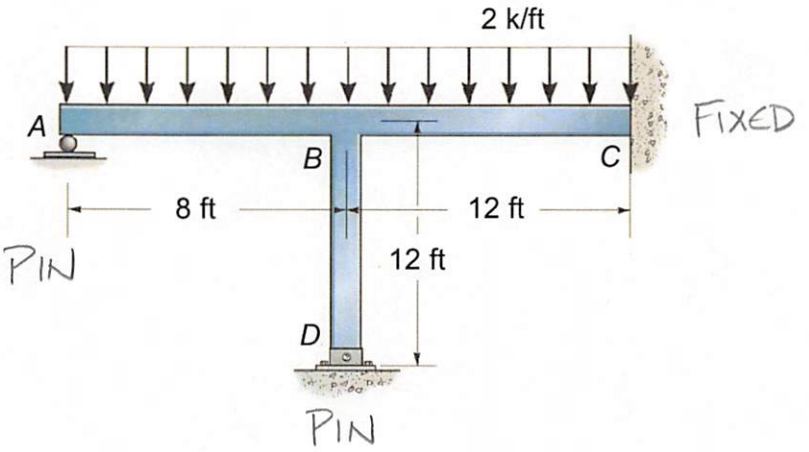
CIVL 4122 Quiz #7 F25 Name: _____

Determine the reaction at *A*. Assume *A* and *D* are pin supports, *C* is fixed, and *E* is constant. Additionally, the I_{AB} and I_{BC} are twice the value of the I_{BD}.



$$FEM_{AB} = \frac{wL^2}{8} = \frac{2k/ft\,(8ft)^2}{8} = 16k\,ft$$

$$FEM_{BC} = \frac{wL^2}{12} = \frac{2k/ft\,(12ft)^2}{12} = \pm 24k\,ft$$

$DF_{AB} = DF_{DB} = 1 \quad DF_{CB} = 0$

JOINT B

$$K_{BA} = \frac{3EI_{AB}}{8'} = \frac{3E(2I_{BD})}{8'} = \frac{3EI_{BD}}{4}$$

$$K_{BC} = \frac{4EI_{BC}}{12'} = \frac{4E(2I_{BD})}{12} = \frac{2EI_{BD}}{3}$$

$$K_{BD} = \frac{3EI_{BD}}{12} = \frac{EI_{BD}}{4}$$

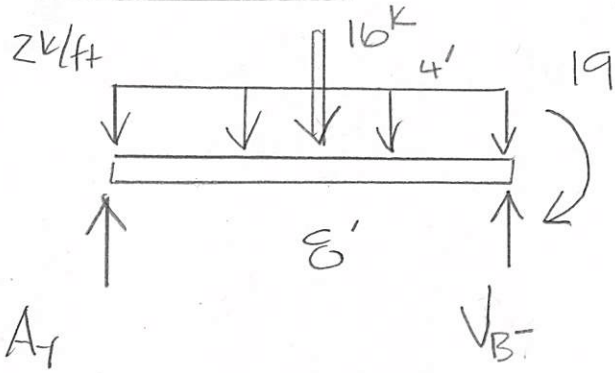
$$DF_{BA} = \frac{K_{BA}}{K_{BA}+K_{BC}+K_{BD}} = \frac{3/4}{3/4+2/3+1/4} = 0.45$$

$$DF_{BC} = \frac{K_{BC}}{K_{BA}+K_{BC}+K_{BD}} = \frac{2/3}{3/4+2/3+1/4} = 0.40$$

$$DF_{BD} = 1 - DF_{BA} - DF_{BC} = 0.15$$

JOINT	A	B			C	D
MEMBER	AB	BA	BD	BC	CB	DB
DF	1	0.45	0.15	0.4	0	1
FEM		16		-24	24	
DIST.		3.6	1.2	3.2		
CO					1.6	
DIST.						
$\sum$		19.6	1.2	-20.8	25.6	

SECTION AB



$\circlearrowleft + \sum M_B = 0$

$= -19.6\,kft + 16^k(4') - A_y(8')$

$A_y = 5.55^k$