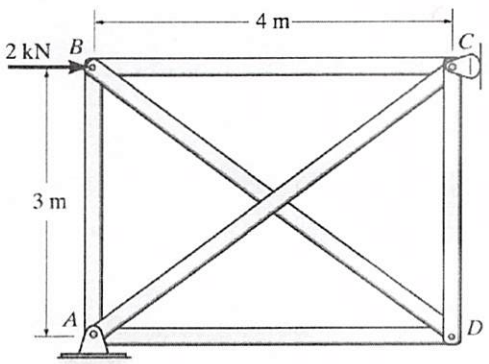
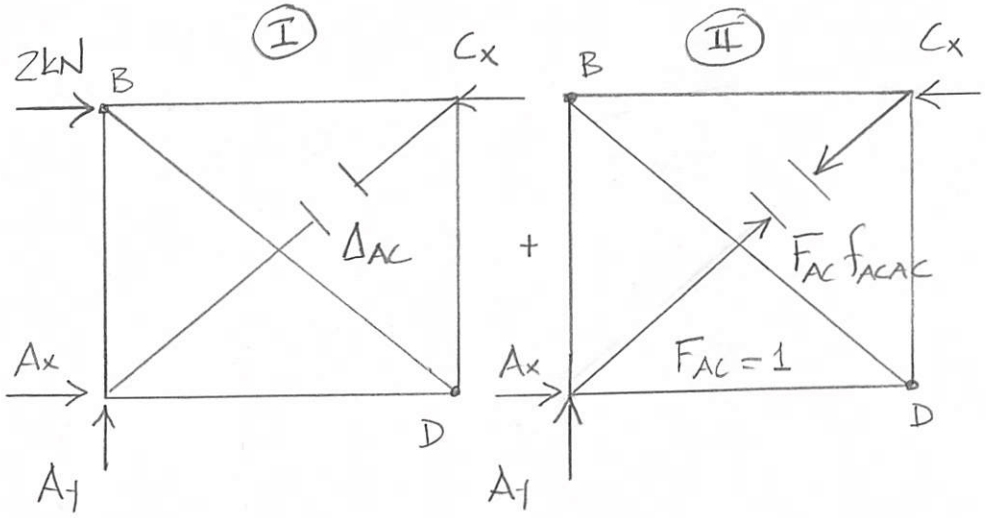
CIVL 4122 Quiz #3 F25 Name: _____

Determine the force in member *AC*. Assume *AE* is constant.





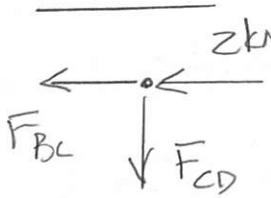
$$\Delta_{AC} + F_{AC} f_{ACAC} = 0$$

(I) $\sum M_A = 0 = C_x(3m) - 2kN(3m)$ $\quad C_x = 2kN$

(II) $\sum M_A = 0 = C_x(3m)$ $\quad C_x = 0$

REAL FORCES

JOINT C



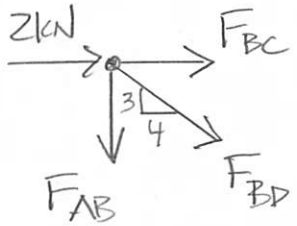
$\xrightarrow{+} \sum F_x = 0$

$= -F_{BC} - 2kN$

$F_{BC} = -2kN$

$+\uparrow \sum F_y = 0 = F_{CD}$

JOINT B



$\xrightarrow{+} \sum F_x = 0$

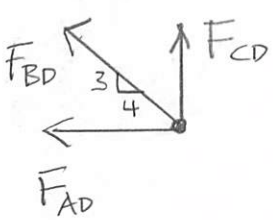
$= F_{BC} + \frac{4}{5} F_{BD} + 2kN$

$F_{BD} = 0$

$+\uparrow \sum F_y = 0 = -F_{AB} - \frac{3}{5} F_{BD}$

$F_{AB} = 0$

JOINT D



$\xrightarrow{+} \sum F_x = 0$

$= -F_{AD} - \frac{4}{5} F_{BD}$

$F_{AD} = 0$

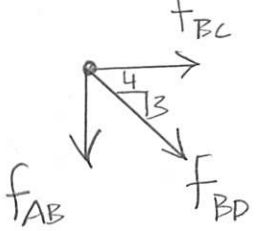
VIRTUAL FORCES

JOINT C

$$\pm\rightarrow \sum F_x = 0 = -f_{BC} - \frac{4}{5}1 \qquad f_{BC} = -0.8$$

$$+\uparrow \sum F_y = 0 = -f_{CD} - \frac{3}{5}1 \qquad f_{CD} = -0.6$$

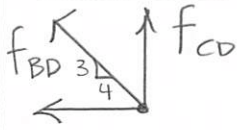
JOINT B



$$\pm\rightarrow \sum F_x = 0 = f_{BC} + \frac{4}{5}f_{BD} \qquad f_{BD} = 1.0$$

$$+\uparrow \sum F_y = 0 = -f_{AB} - \frac{3}{5}f_{BD} \qquad f_{AB} = -0.6$$

JOINT D



$$\pm\rightarrow \sum F_x = 0 = -f_{AD} - \frac{4}{5}f_{BD} \qquad f_{AD} = -0.8$$

MEMBER	F(kN)	f	L(m)	FfL (kNm)	ffL (m)
AB	0	-0.6	3	0	1.08
BC	-2	-0.8	4	6.40	2.56
CD	0	-0.6	3	0	1.08
DA	0	-0.8	4	0	2.56
AC	0	1	5	0	5
BD	0	1	5	0	5
			$\sum$	6.4	17.28

$$\Delta_{AC} + F_{AC} f_{ACAC} = 0 = 6.4\ \text{kNm} + F_{AC}(17.28\text{m})$$

$$F_{AC} = -0.37\ \text{kN}$$