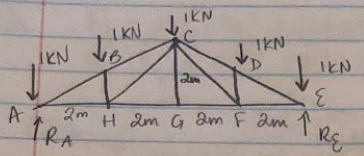
Quiz #5



$\Sigma M_A = 0$

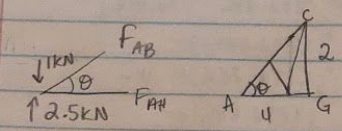
$(R_E \times 2 \times 4) = (1 \times 2) + (1 \times 2 \times 2) + (1 \times 2 \times 3) + 1 \times (2 \times 4)$

$R_E \times 4 = 1 + 2 + 3 + 4$

$R_E = 2.5\,kN$

$R_A = R_E = 2.5\ kN$

Case 1:



$\theta = \tan^{-1}\left(\frac{2}{4}\right) = 26.565°$

Σ vertical = 0

$2.5 + F_{AB} \sin\theta = 1$

$F_{AB} = \frac{-1.5}{\sin(26.565°)} = -3.354\ kN$

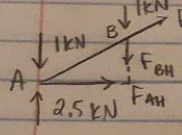
Σ Horizontal = 0

$F_{AB}\cos\theta + F_{AH} = 0$

$-3.354 \cos(26.565°) + F_{AH} = 0$

$F_{AH} = 3kN$ (tensile)

case 2:

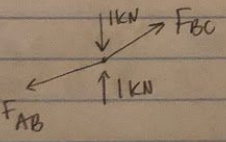


$(1 \times 2) + (F_{BH} \times 2) = 0 = \Sigma M_A$

$F_{BH} = -1\ kN$ (compressive)

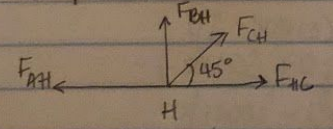
FBD @ point B

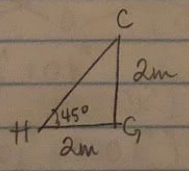
$F_{AB} = F_{BC} = -3.354\ kN$ (compressive)



case 3:

FBD @ point H





Σ Vertical = 0

$F_{BH} + F_{CH} \sin 45° = 0$

$-1 + F_{CH} \sin 45° = 0$

$F_{CH} = 1.414\ kN$ (tensile)

Σ Horizontal = 0

$F_{AH} = F_{CH}\cos 45° + F_{HG}$

$3 = (1.414 \frac{1}{\sqrt{2}}) + F_{HG}$

$F_{HG} = 2\ kN$ (tensile)

Quiz #5 Cont.

Due to symmetry:

$F_{AB} = F_{DE} = -3.354$ kN (compressive)

$F_{AH} = F_{DF} = 3$kN (Tensile)

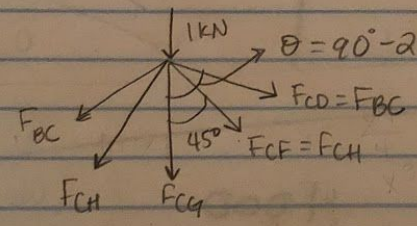
$F_{BH} = F_{DF} = -1$kN (compressive)

$F_{BC} = F_{CD} = -3.354$ kN (compressive)

$F_{HC} = F_{CF} = 1.414$ kN (tensile)

$F_{HG} = F_{CF} = 2$ kN (tensile)

Case 4: FBD @ point C



$1 + 2F_{BC}\cos 63.435 + 2F_{CH}\cos 45° + F_{CG} = 0$

$1 + 2(-3.354\cos 63.435°) + 2(1.414\cos 45°) + F_{CG} = 0$

$1 - 3 + 2 + F_{CG} = 0$

$F_{CG} = 0$ KN