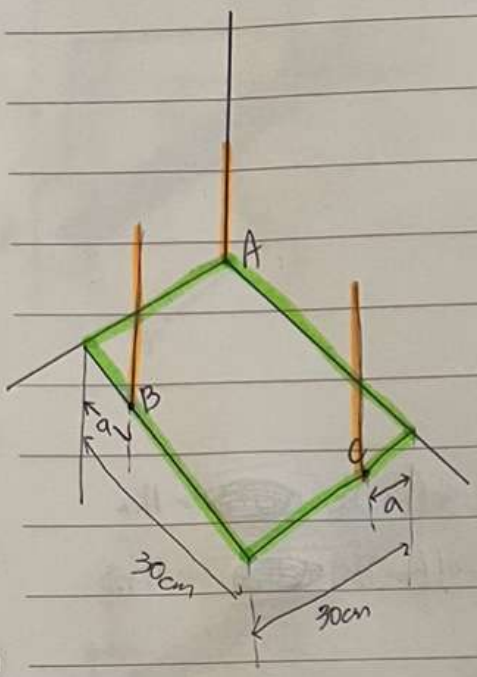
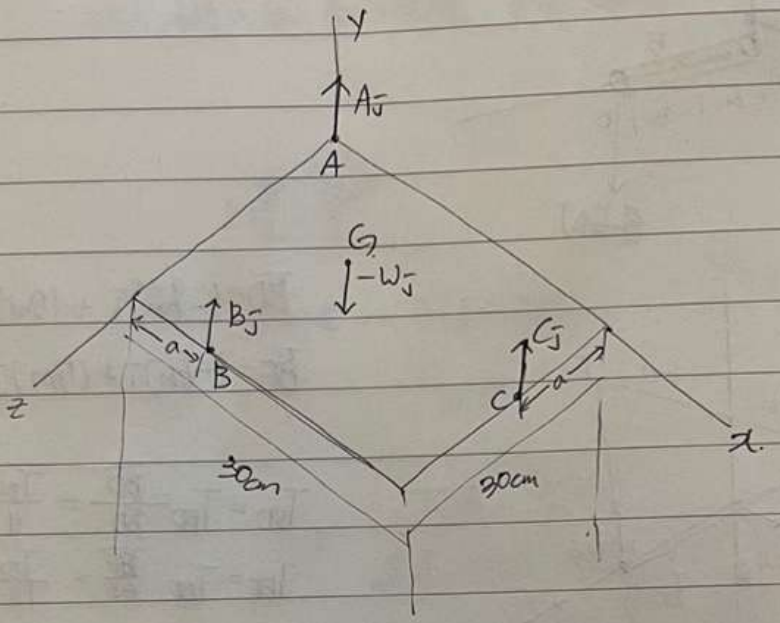
〈예제 4.103〉



(a) $a=10$ 일 때, 각 케이블의 장력

(b) 장력이 80N 일 때, a.



$r_{B/A} = 0\bar{i} + 30k$, $r_{C/A} = 30\bar{i} + ak$, $r_{G/A} = 15\bar{i} + 15k$

$\Sigma M_A = 0$: $r_{B/A} \times B_J + r_{C/A} \times C_J + r_{G/A} \times (-W_J) = 0$

$(a\bar{i} + 30k) \times B_J + (30\bar{i} + ak) \times C_J + (15\bar{i} + 15k) \times (-WJ)$

$= Bak - 30B\bar{i} + 30Bk - Ba\bar{i} - 15Wk + 15W\bar{i} = 0$

$\bar{i}$: $-30B - Ba + 15W = 0 \rightarrow B = \frac{15W}{30+a} = C$

$\Sigma F_y = 0$: $A + B + C - W = 0 \rightarrow A + 2\left(\frac{15W}{30+a}\right) - W = 0$, $A = \frac{aW}{30+a}$

(a) $a=10$, $C = B = \frac{15(240N)}{30+10} = 90N$

$A = \frac{10(240N)}{30+10} = 60N$ $\therefore A = 60N$, $B = C = 90N$

(b) $A = B = C = 80N$, $80N = \frac{15(240N)}{30+a}$ $\therefore a = 15cm$