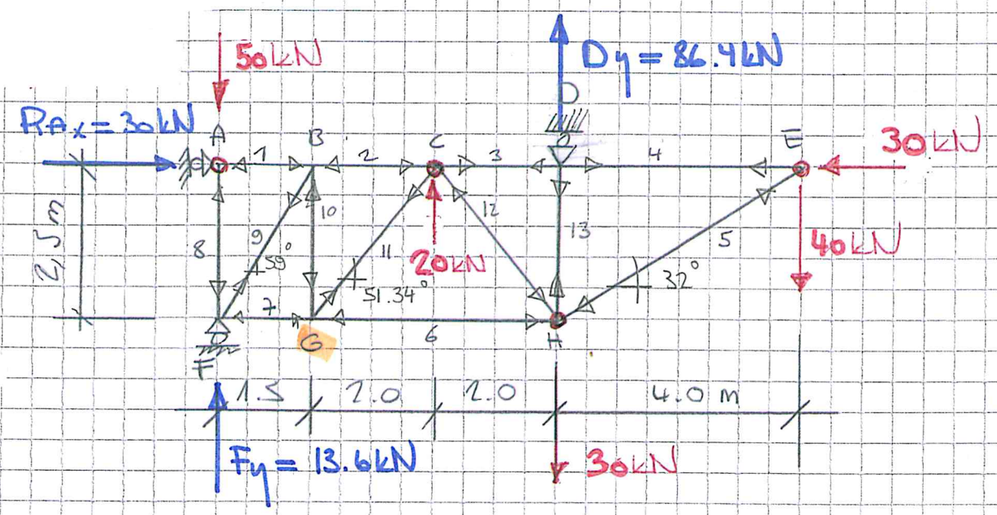
SERIE A

18.01.22 ETC 3 STATIQUE NOM : _____

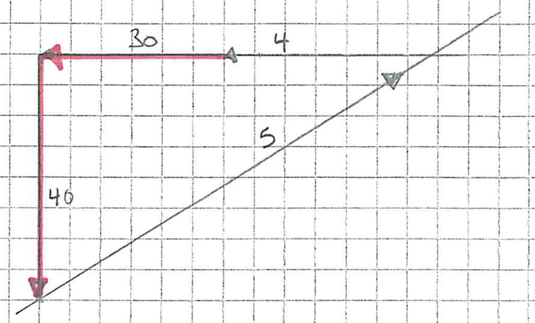
1. Déterminer les efforts dans le treillis ci-dessous :

30 pts efforts ds barres
15 pts réaction d'appuis
5 pts équilibre analytique du noeud G inconnues 7 et 11

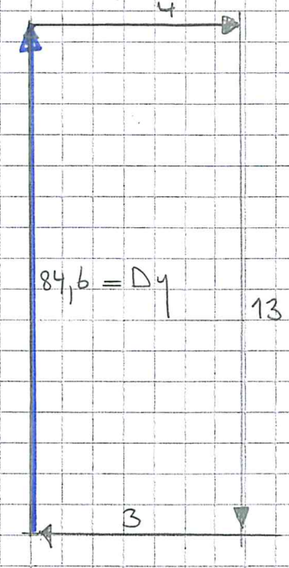


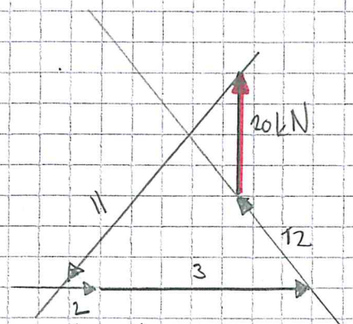
N°	Efforts +/-
1	- 30 kN
2	- 7 kN
3	+ 34 kN
4	+ 34 kN
5	- 75 kN
6	- 52 kN
7	- 23 kN
8	- 50 kN
9	+ 42 kN
10	- 36 kN
11	+ 46 kN
12	- 19 kN
13	+ 86,4

Noeud E



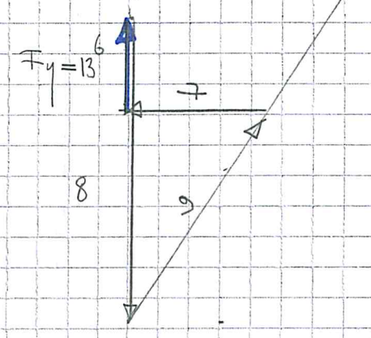
Noeud D



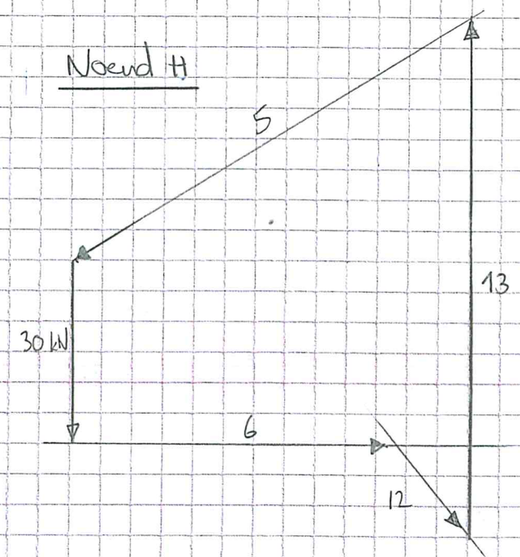


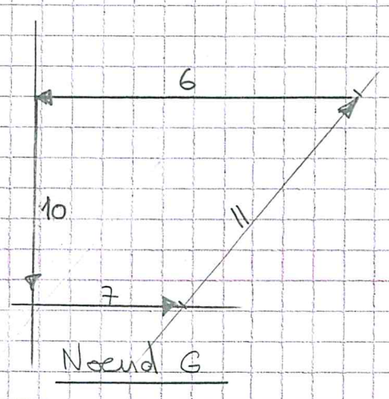
Noeud C

Noeud F



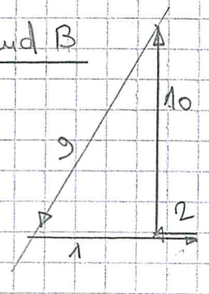
Noeud H



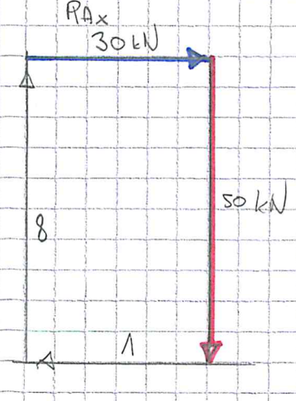


Noeud G

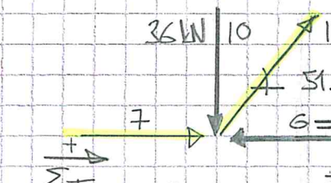
Noeud B



Noeud A



Equilibre analytique noeud G



$\sum F_x = 0$ $\quad F_7 - 52\text{ kN} + F_{11} \cdot \cos 51{,}34 = 0$

$\sum F_y = 0$ $\quad -36 + F_{11} \sin 51.34° = 0$

$F_{11} = \frac{36}{\sin 51.34°} = 46.1\text{ kN}$

$F_7 = 52 - 46.1 \cdot \cos 51{,}34° = 23.2\text{ kN}$

Réaction d'appuis

$\rightarrow^{+}$ $\Sigma F = 0$ $\quad -30 + R_{Ax} = 0$ $\quad R_{Ax} = 30\,kN$

$\uparrow^{+}$ $\Sigma F = -50 + 20 - 30 - 40 + F_y + D_y = 0$

$F_y + D_y = 100\,kN$

$\circlearrowleft^{+}$ $\Sigma M_F = (-30 \cdot 2{,}5) + (20 \cdot 3{,}5) - (30 \cdot 5{,}5) - (40 \cdot 9{,}5) + (30 \cdot 2{,}5) + D_y \cdot 5{,}5 = 0$

$$D_y = \frac{475}{5{,}5} = 86{,}4\,kN$$

$F_y = 100 - 86{,}4 = +13{,}6\,kN$

Contrôle :

$\circlearrowleft^{+}$ $\Sigma M_D = 0$ $\quad (50 \cdot 5{,}5) - (13{,}6 \cdot 5{,}5) - (20 \cdot 2) - (40 \cdot 4) = 0.2\,kN$ ✓

AFRY
ÅF PÖYRY