EXAMEN FINAL

PUNTO E ↓ VERTICAL
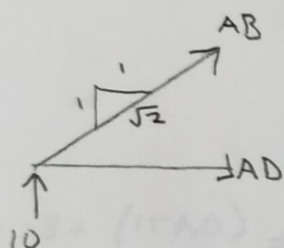
PROBLEMA 3

$\sum M_F = 0$

$10(10) + 10(20) - 30 A_y = 0$

$A_y = 10 K \uparrow = F_y$

NODO A

$\sum F_y = 0$

$\frac{1}{\sqrt{2}} AB + 10 = 0$

$AB = -14,142$ Ⓒ
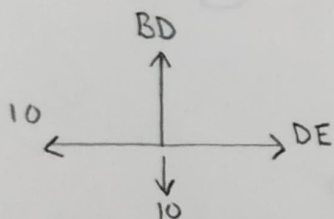
$\sum F_x = 0$

$\frac{1}{\sqrt{2}}(-14,142) + AD = 0$

$AD = 10$ Ⓣ

NODO D

$\sum F_y = 0$

$BD - 10 = 0$
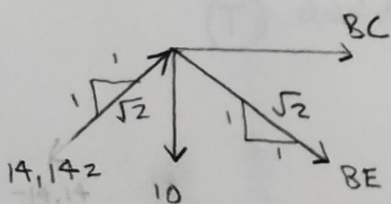
$BD = 10$ Ⓣ

$\sum F_x = 0$

$-10 + DE = 0$

$DE = 10$ Ⓣ

NODO B

$\sum F_y = 0$

$\frac{1}{\sqrt{2}}(14,142) - 10 - \frac{1}{2} BE = 0$

$BE = 0$

$\sum F_x = 0$

$\frac{1}{\sqrt{2}}(14,142) + BC = 0$

$BC = -10$ Ⓒ

- -

$\sum M_F = 0$

$10(1) - 30 A_y = 0$

$A_y = 0,333 \uparrow = F_y$

$\sum F_y = 0$

$0,333 - 1 + f_y = 0$

$f_y = 0,667 \uparrow$

nodo a
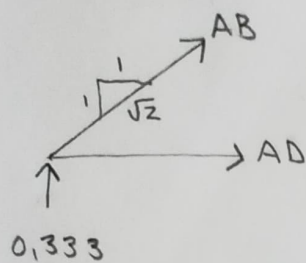
$\Sigma F_y = 0$
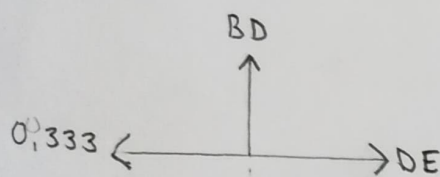
$0.333 + \frac{1}{\sqrt{2}} AB = 0$

$AB = -0.471 \;(C)$

$\Sigma F_x = 0$

$\frac{1}{\sqrt{2}}(-0.471) + AD = 0$

$AD = 0.333 \;(T)$

nodo d

$\Sigma F_y = 0$

$BD = 0$

$\Sigma F_x = 0$

$-0.333 + DE = 0$

$DE = 0.333 \;(T)$

nodo b
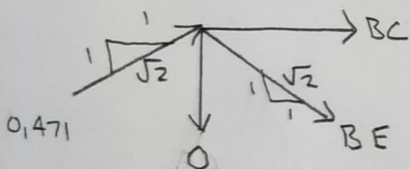
$\Sigma F_y = 0$

$\frac{1}{\sqrt{2}}(0.471) - \frac{1}{\sqrt{2}} BE = 0$

$BE = 0.471 \;(T)$

$\Sigma F_x = 0$

$\frac{1}{\sqrt{2}}(0.471) + \frac{1}{\sqrt{2}}(0.471) + BC = 0$

$BC = -0.666 \;(C)$

nodo c
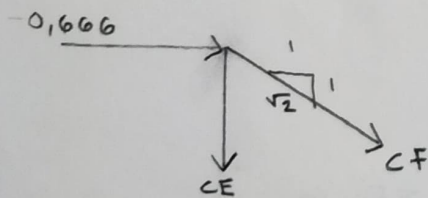
$\Sigma F_x = 0$

$0.666 + \frac{1}{\sqrt{2}} CF = 0$

$CF = -0.942 \;(C)$

$\Sigma F_y = 0$

$-CE - \frac{1}{\sqrt{2}}(-0.942) = 0$

$CE = 0.666 \;(T)$

nodo f
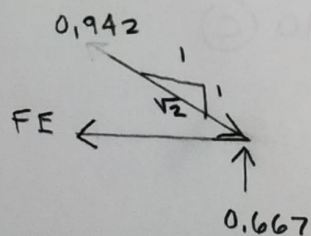
$\Sigma F_x = 0$

$-FE + \frac{1}{\sqrt{2}}(0.942) = 0$

$FE = 0.666 \;(T)$

	n	N	L	$n N L$
AB	-0,471	-14,142	14,14	94,185
AD	0,333	10	10	33,3
BD	0	10	10	0
BC	-0,666	-10	10	66,6
BE	0,471	0	14,14	0
CE	0,666	10	10	66,6
CF	-0,942	-14,142	14,14	188,37
DE	0,333	10	10	33,3
FE	0,666	10	10	66,6
				548,955

$$\Delta_c = \frac{\Sigma n N L}{AE} = \frac{548,955 \,(12)}{0,5\,(29000)} = 0,4543 \text{ pulg} \downarrow$$

PROBLEMA 1

$\Sigma M_c = 0$

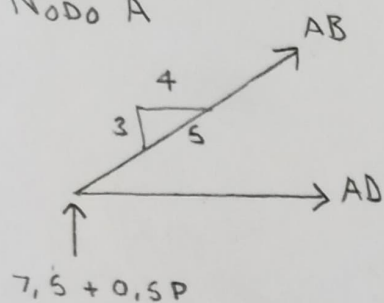$15(4) + (4)P - 8A_y = 0$

$A_y = 7,5 + 0,5 P$

$\Sigma F_y = 0$

$7,5 + 0,5P - 15 - 20 - P + C_y = 0$

$C_y = 27,5 + 0,5 P$

$\Sigma F_x = 0$

$C_x = 0$

NODO A

$7,5 + 0,5P$

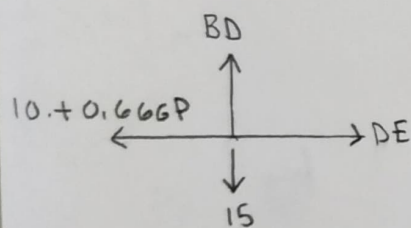$\Sigma F_y = 0$

$7,5 + 0,5P + \dfrac{3}{5} AB = 0$

$AB = -12,5 - 0,833 P$

$\Sigma F_x = 0$

$\dfrac{4}{5}(-12,5 - 0,833P) + AD = 0$

$AD = 10 + 0,666 P$

NODO D

$\Sigma F_y = 0$

$BD - 15 = 0$
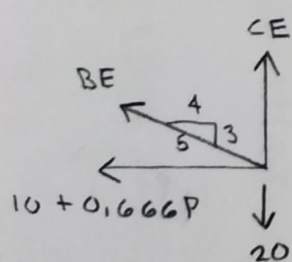
$BD = 15$

$\Sigma F_x = 0$

$DE - 10 - 0,666P = 0$

$DE = 10 + 0,666 P$

NODO E

$\Sigma F_x = 0$

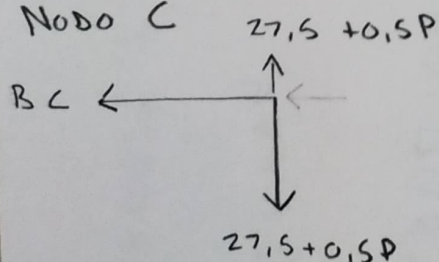$-(10 + 0,666 P) - \dfrac{4}{5} BE = 0$

$BE = -12,5 - 0,832 P$

$\Sigma F_y = 0$

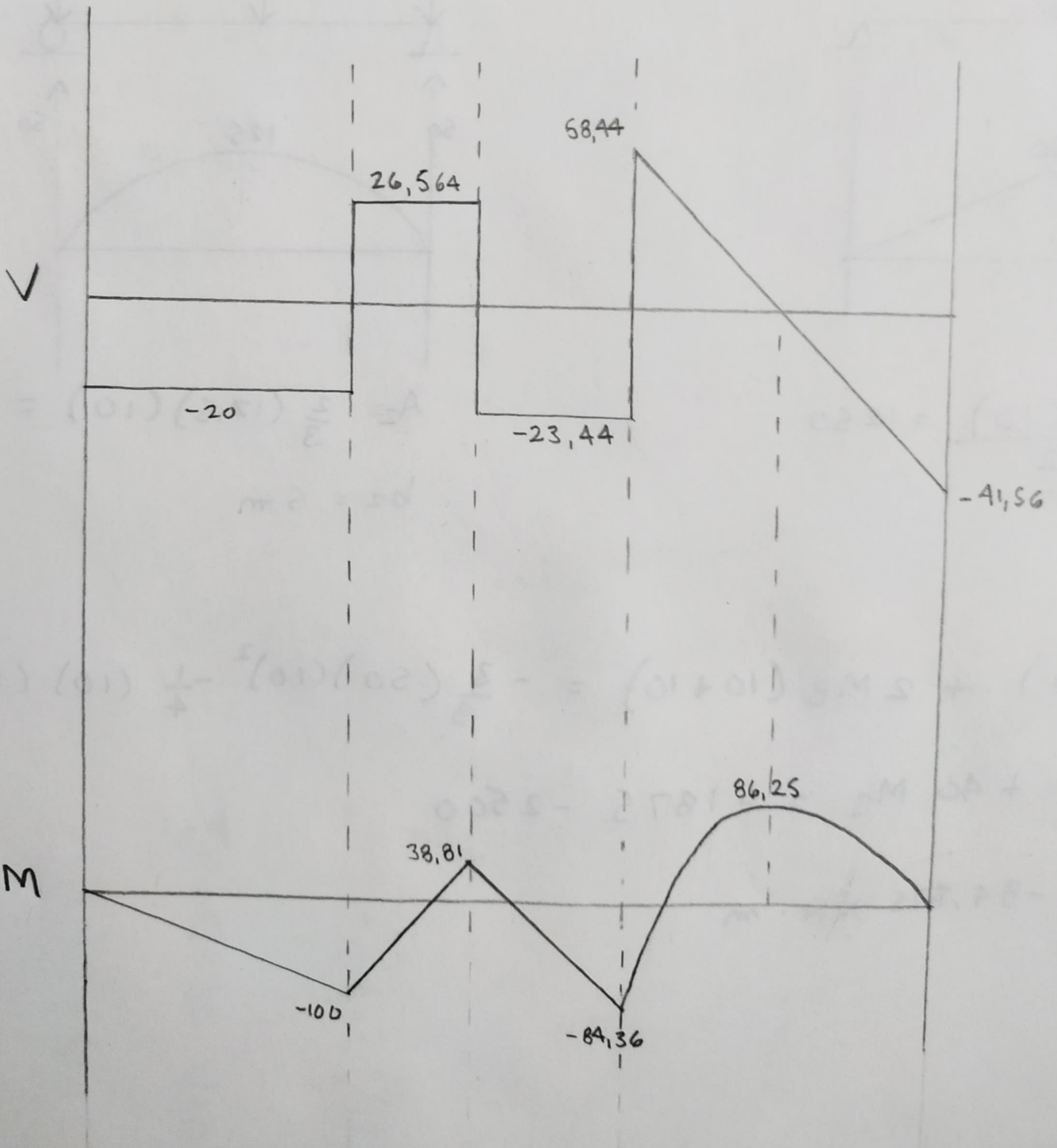$CE - 20 + \dfrac{3}{5}(-12,5 - 0,832 P) = 0$
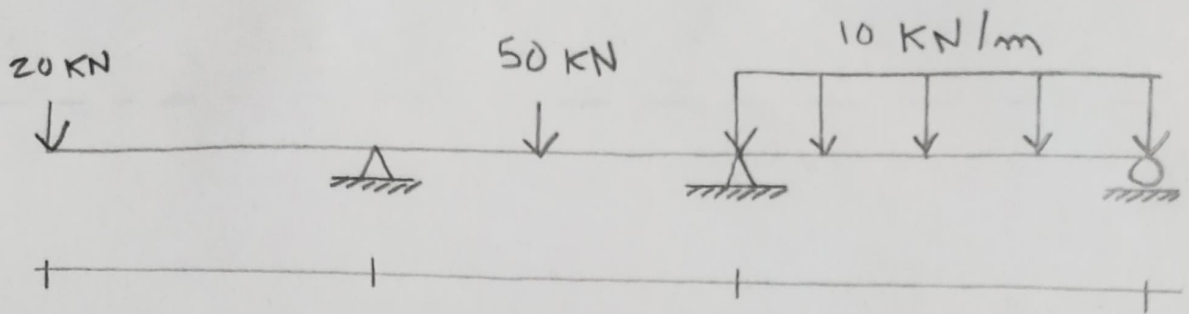
$CE = 27,5 + 0,5 P$

NODO C

$27,5 + 0,5P$

$27,5 + 0,5P$

$\Sigma F_x = 0$

$BC = 0$

	L	F	$\frac{\partial F}{\partial P}$	LF$\left(\partial F/\partial P\right)$
AB	5	$-12,5-0,833P$	$-0,833$	52,062
AD	4	$10 + 0,666P$	0,666	26,64
BD	3	15	0	0
BC	4	0	0	0
BE	5	$-12,5 -0,832P$	$-0,832$	52
CE	3	$27,5 +0,5P$	0,5	41,25
DE	4	$10 + 0,666P$	0,666	26,64
				198,592

$$\Delta_B = \frac{198,592}{EA} \ KN \cdot m \ \downarrow$$

PROBLEMA 2

20 KN

50 KN

10 KN/m

V

26,564

58,44

-20

-23,44

-41,56

M

38,81

86,25

-100

-84,36

$$M = 5(20) = 100 \text{ KN} \cdot m$$

20

50

250

M

125

50   125   50
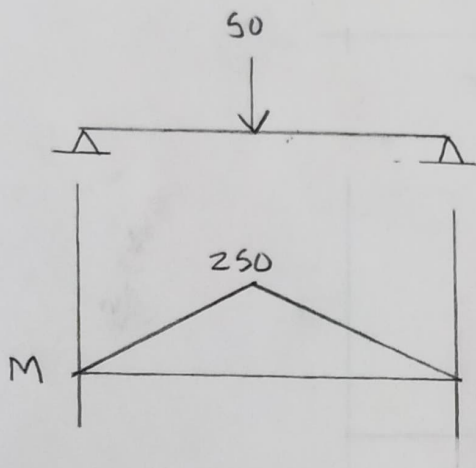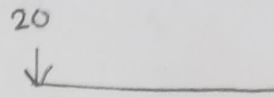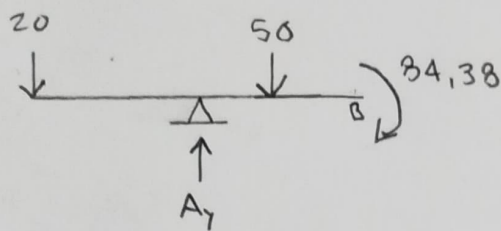
$$A_1 = \frac{250(10)}{2} = 1250$$

$$a_1 = 5 m$$
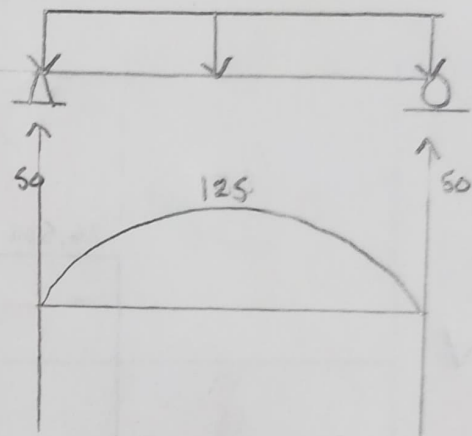
$$A_2 = \frac{2}{3}(12.5)(10) = 833.33$$

$$b_2 = 5 m$$

$$-100(10) + 2M_B(10+10) = -\frac{3}{8}(50)(10)^2 - \frac{1}{4}(10)(10)^3$$
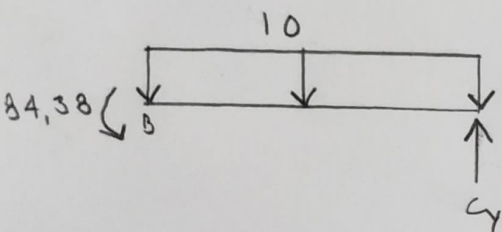
$$-1000 + 40 M_B = -1875 - 2500$$

$$M_B = -84.375 \text{ KN} \cdot m$$

$$\sum M_B = 0$$

20   50   84,38 $-84,38 + 20(15) - 10 A_y + 50(5) = 0$

A_y

$$\boxed{A_y = 46,56 \text{ KN} \uparrow}$$

10   84,38 $\sum M_B = 0$

$84,38 - \dfrac{10^3}{2} + 40\,C_y = 0$

C_y

$$\boxed{C_y = 41,56 \text{ KN} \uparrow}$$

$$\sum F_y = 0$$

$$-20 - 50 - 10^2 + 46,56 + 41,56 + B_y = 0$$

$$\boxed{B_y = 81,88 \text{ KN} \uparrow}$$