

1. a) V b) V c) F d) F e) F

2.  $\vec{r}_{D/E} = -4\hat{i} + 4\hat{j}$  pie

$\vec{P} = \frac{30\sqrt{41}}{\sqrt{41}} (-4\hat{i} + 5\hat{k})$  lb

Momento del par 1  $\vec{M}_1 = \vec{r}_{D/E} \times \vec{P}$

$\vec{M}_1 = 600\hat{i} + 600\hat{j} + 480\hat{k}$  lb·pie

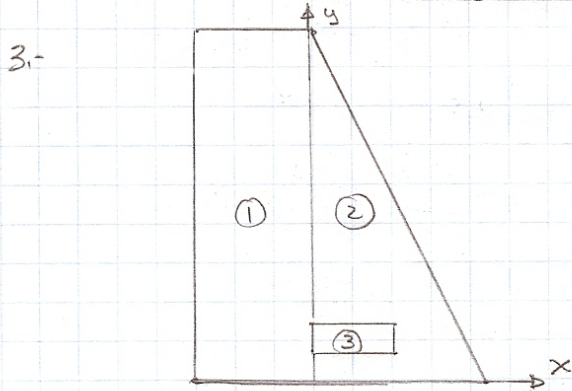
$\vec{r}_{D/A} = 4\hat{i} + 4\hat{j} - 10\hat{k}$  pie

$\vec{F} = 30\hat{j}$  lb

Momento del par 2  $\vec{M}_2 = \vec{r}_{D/A} \times \vec{F}$

$\vec{M}_2 = 300\hat{i} + 120\hat{k}$  lb·pie

$\vec{M} = \vec{M}_1 + \vec{M}_2 = 900\hat{i} + 600\hat{j} + 600\hat{k}$  lb·pie



3.

$\bar{x}_i$ [pies]	$\bar{y}_i$ [pies]	$A_i$ [pies <sup>2</sup> ]	$\bar{x}_i A_i$ [pies <sup>3</sup> ]	$\bar{y}_i A_i$ [pies <sup>3</sup> ]
-----------------------	-----------------------	-------------------------------	-----------------------------------------	-----------------------------------------

① -2      6      48      -96      288

② 2      4      36      72      144

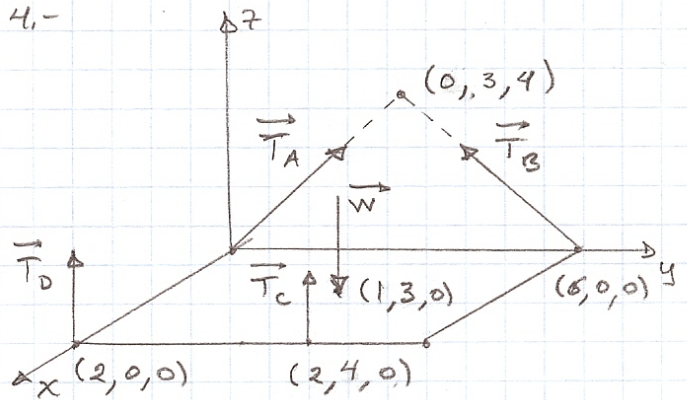
③  $\frac{a}{2}$       1.5      -a       $-\frac{a^2}{2}$       -1.5a

$\sum \bar{x}_i A_i = -24 - \frac{a^2}{2}$  ;  $\sum A_i = 84 - a$

$\bar{x} = \frac{\sum \bar{x}_i A_i}{\sum A_i} = -\frac{26}{82} \rightarrow a = 2$  pies,

$\Rightarrow \bar{y} = 5.23$  pies

4.



$\sum F_y = \frac{3}{5} T_A - \frac{3}{5} T_B = 0 \Rightarrow T_A = T_B = T$

$\sum F_z = \frac{4}{5} T_A + \frac{4}{5} T_B + T_C + T_D - W = 0$

$\Rightarrow \frac{8}{5} T + T_C + T_D = 400 \dots \textcircled{1}$

$\sum M_{xx} = 6\left(\frac{4}{5} T_B\right) + 4T_C - 3W = 0$

$\Rightarrow \frac{24}{5} T + 4T_C = 1200 \dots \textcircled{2}$

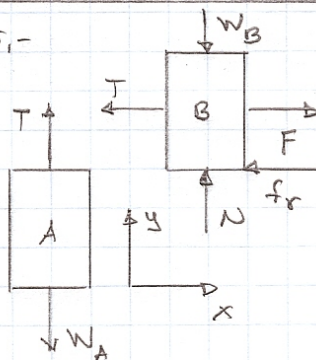
$\sum M_{yy} = -2T_C - 2T_D + 1W = 0$

$\Rightarrow T_C + T_D = 200 \dots \textcircled{3}$

Resolviendo el sistema  $\textcircled{1}, \textcircled{2}, \textcircled{3}$

$T_A = T_B = 125 \text{ N} ; T_C = 150 \text{ N} ; T_D = 50 \text{ N}$

5.



Bloque B

$\sum F_x = F - T - f_r = 0$

$\sum F_y = N - W_B = 0$

Bloque A

$\sum F_y = T - W_A = 0$

$f_r = \mu_s N = \mu_s W_B ; T = W_A$

$\Rightarrow F - W_A - \mu_s W_B = 0 \Rightarrow F = 147.15 \text{ N}$

$F = kS \rightarrow S = 0.735 \text{ m}$