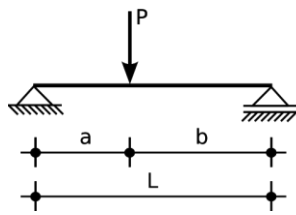
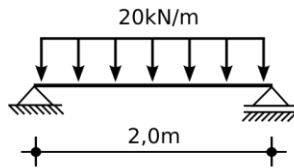


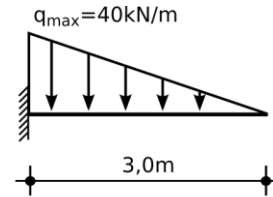
**Ejercicio 5.1**



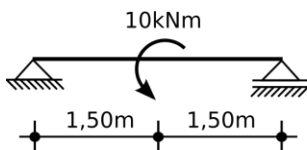
$$\begin{aligned} \uparrow R_{izq.} &= \frac{Pb}{L} \\ \uparrow R_{der.} &= \frac{Pa}{L} \\ V &= -\frac{Pa}{L} \quad M = \frac{Pa}{2} \end{aligned}$$



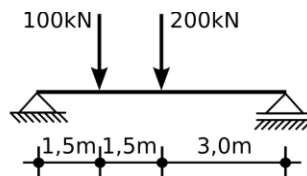
$$\begin{aligned} \uparrow R_{izq.} &= \uparrow R_{der.} = 20\text{kN} \\ V &= 0 \\ M &= 10\text{kNm} \end{aligned}$$



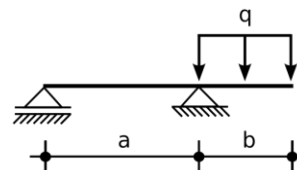
$$\begin{aligned} \uparrow R_{izq.} &= 60\text{kN} \\ \curvearrowright M_{izq.} &= 60\text{kNm} \\ V &= 60\text{kN} \\ M &= -60\text{kNm} \end{aligned}$$



$$\begin{aligned} \uparrow R_{izq.} &= 3.33\text{kN} \\ \downarrow R_{izq.} &= 3.33\text{kN} \\ V &= 3.33\text{kN} \\ M_{izq.} &= 5\text{kN} \\ M_{der.} &= -5\text{kNm} \end{aligned}$$

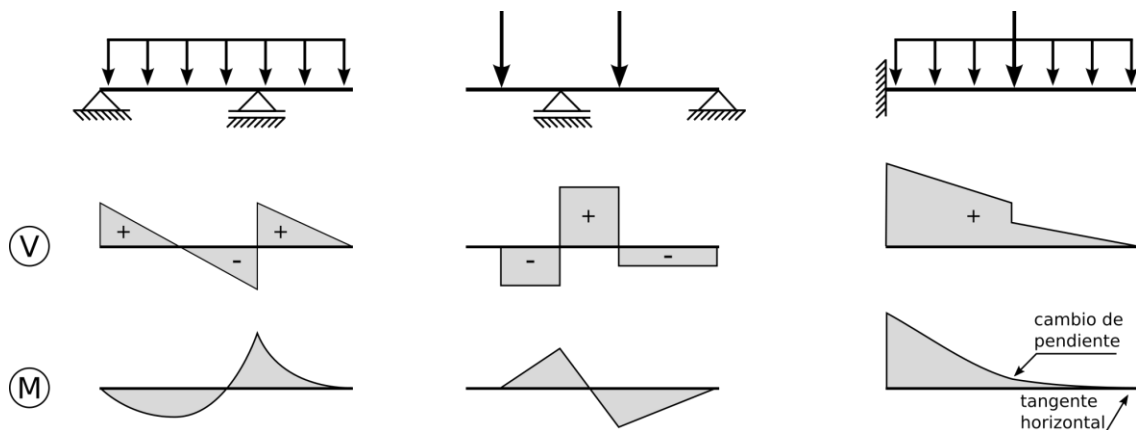


$$\begin{aligned} \uparrow R_{izq.} &= 175\text{kN} \\ \uparrow R_{der.} &= 125\text{kN} \\ V_{izq.} &= 75\text{kN} \\ V_{der.} &= -125\text{kN} \\ M_{der.} &= 375\text{kNm} \end{aligned}$$

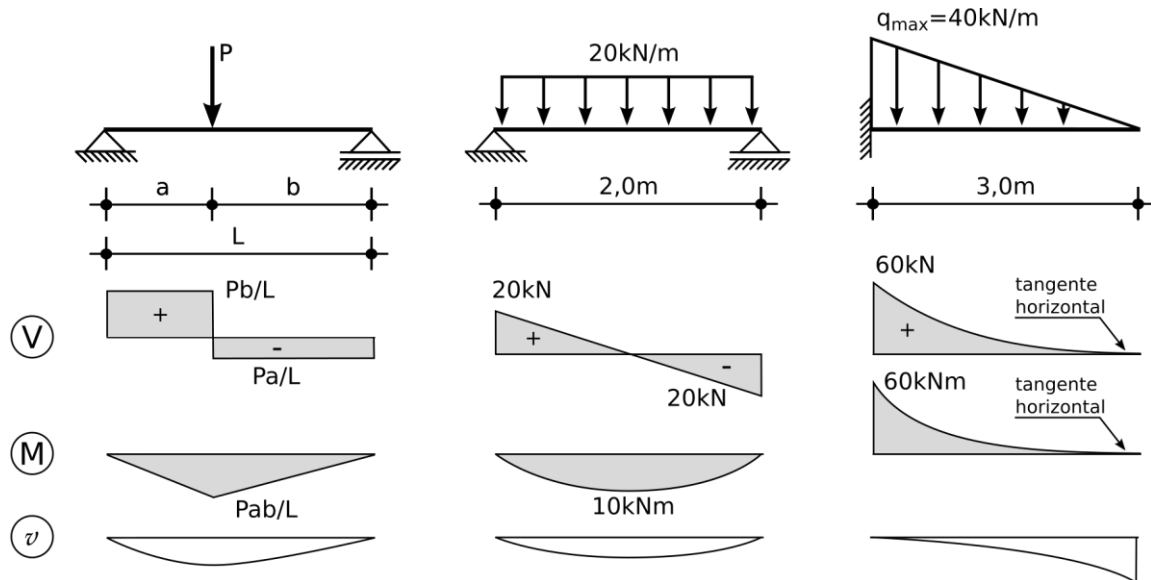


$$\begin{aligned} \downarrow R_{izq.} &= \frac{qb^2}{2a} \\ \uparrow R_{der.} &= qb + \frac{qb^2}{2a} \\ V_{izq.} &= -\frac{qb^2}{2a} \quad V_{der.} = qb \\ M &= -\frac{qb^2}{2} \end{aligned}$$

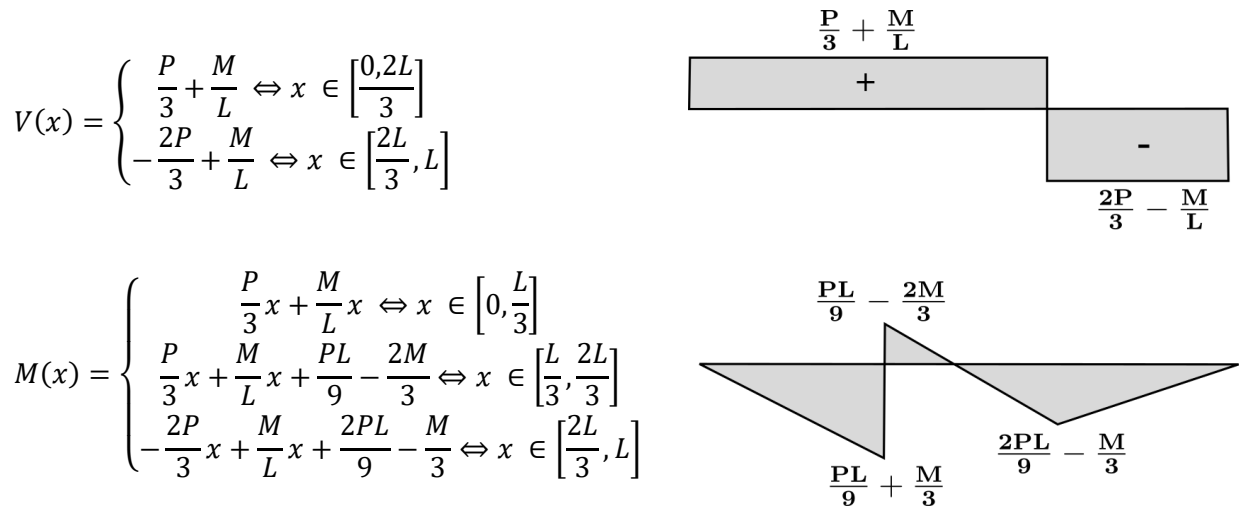
**Ejercicio 5.2**



**Ejercicio 5.3**

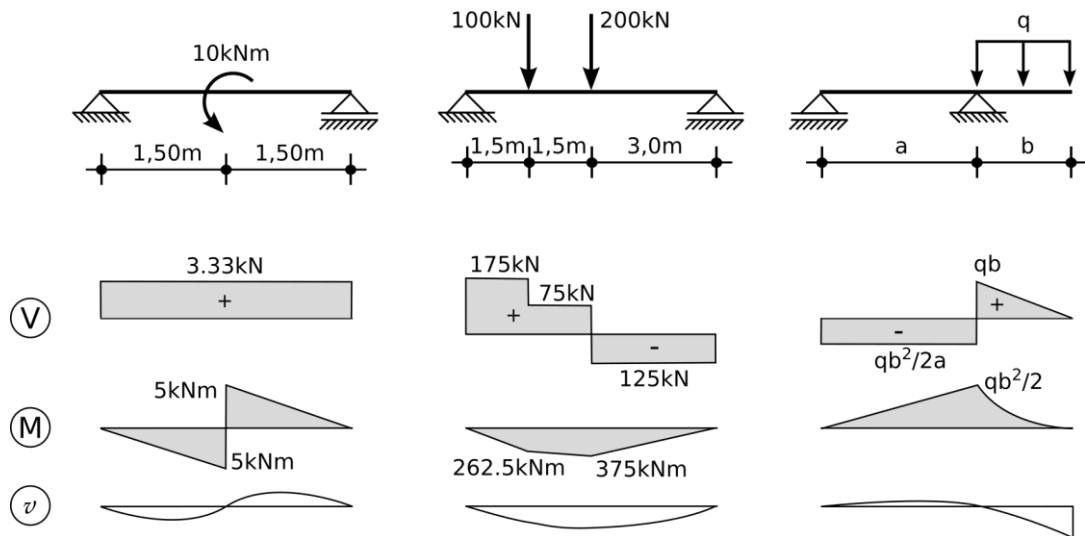


**Ejercicio 5.4 (Conceptual)**



**Ejercicio 5.5**

a)



b)

$$A \geq 5.98\text{cm}$$

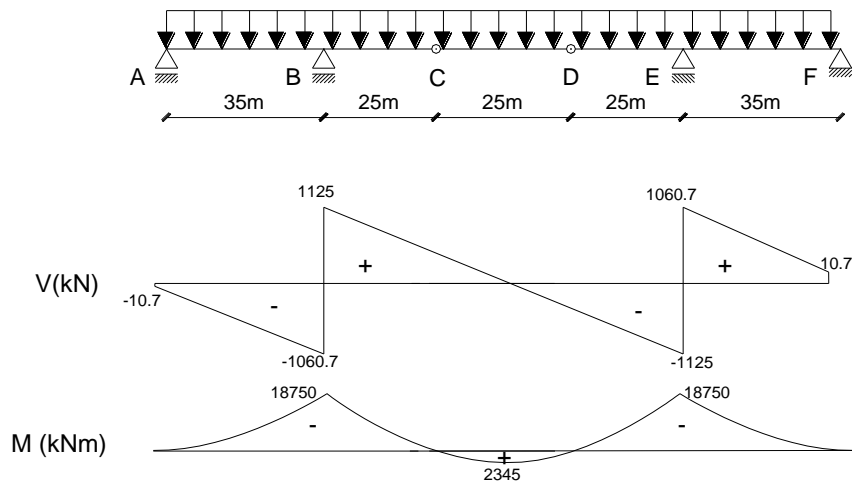
$$A \geq 25.2\text{cm}$$

$$A \geq \sqrt[3]{\frac{3qb^2}{14\text{kN/cm}^2}} \text{ cm}$$

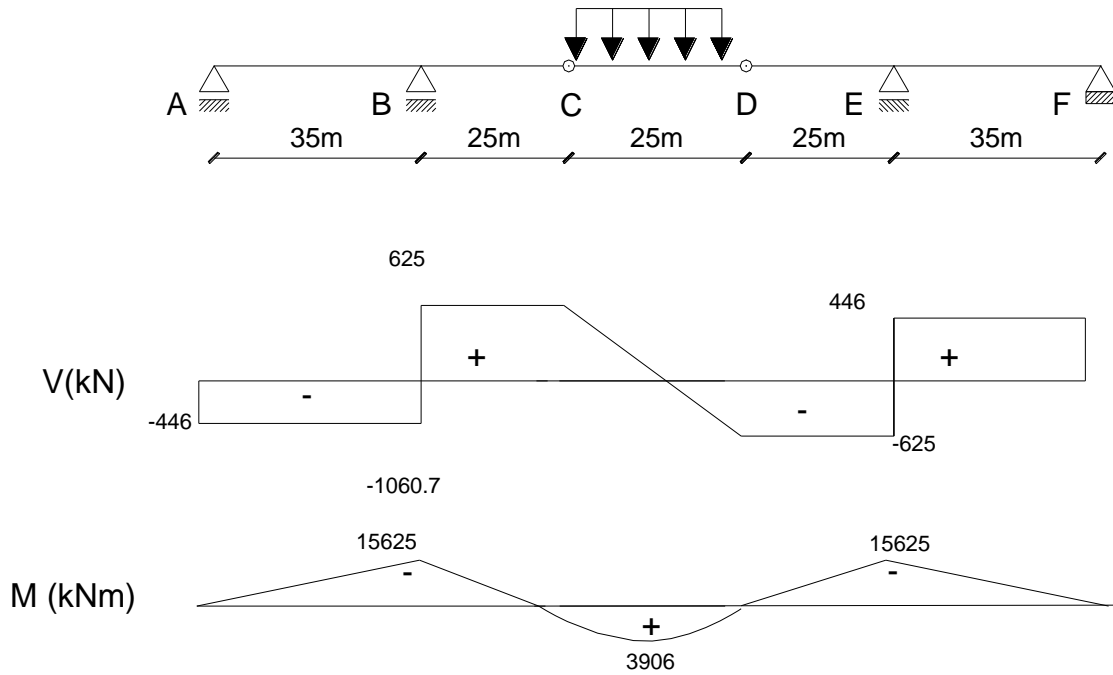
En donde A es la dimensión de un lado de una sección cuadrada.

**Ejercicio 5.6**

b.i)



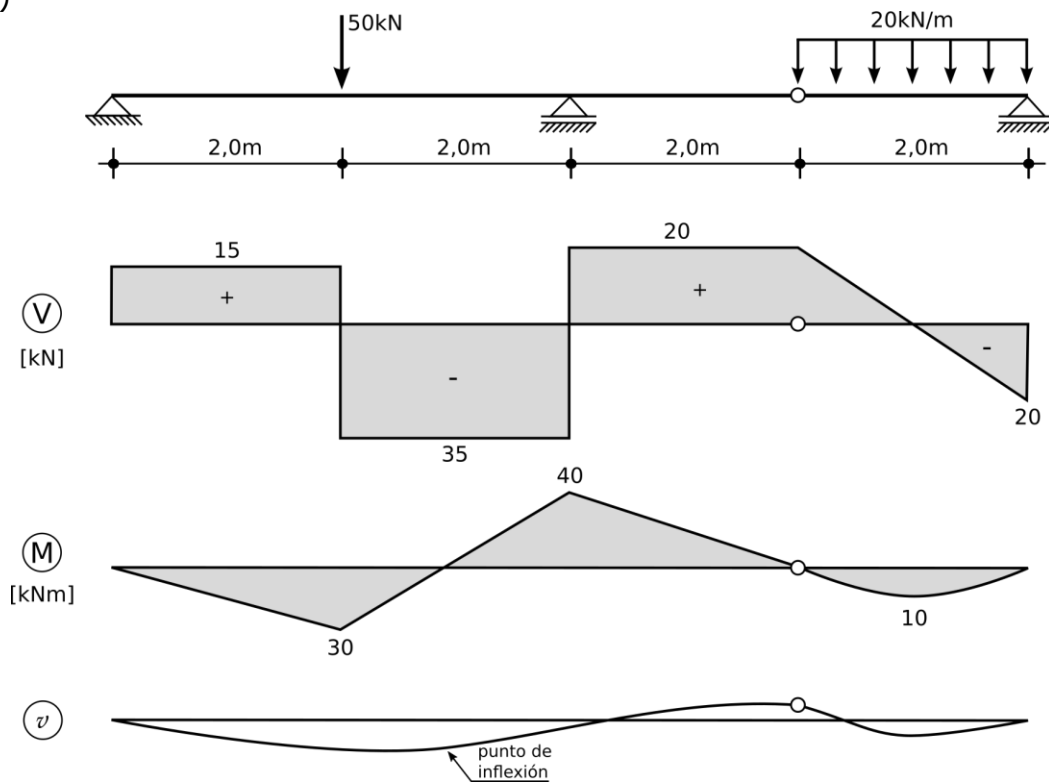
**b.ii)**

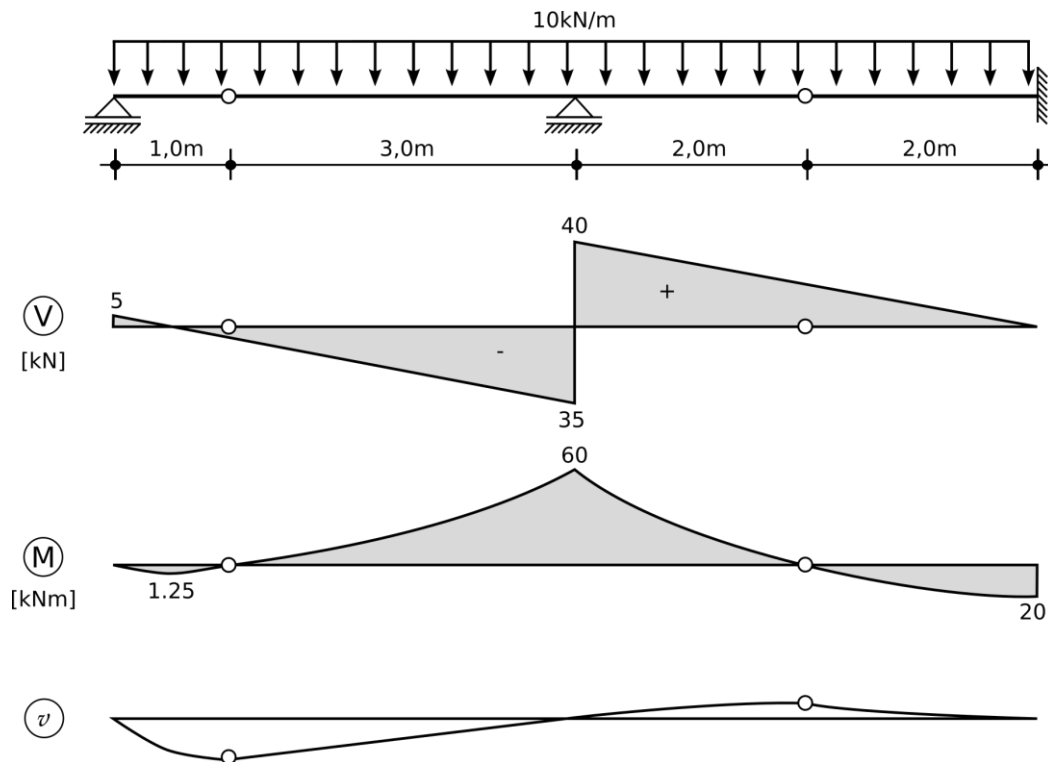


**b.iii)** Ver ejercicio 5.5 f).

**Ejercicio 5.7**

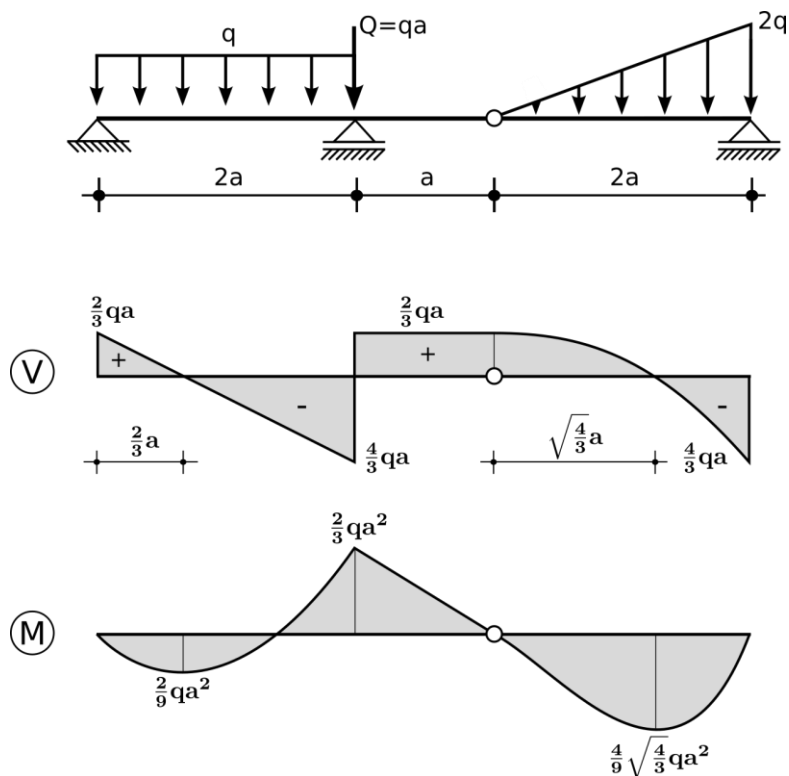
a)

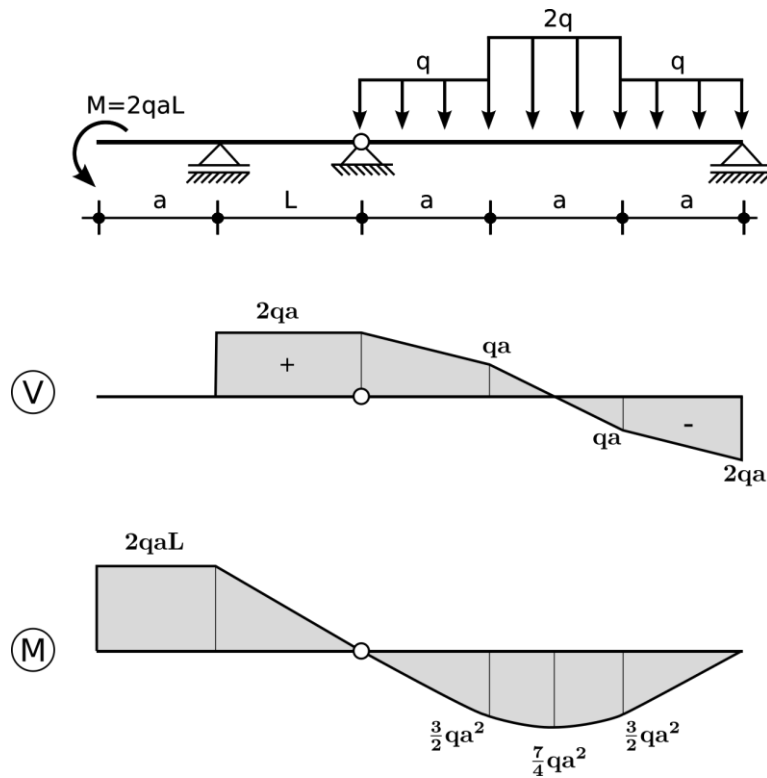




b) El primer caso se dimensiona con un PNI 24 y el segundo con PNI 26.

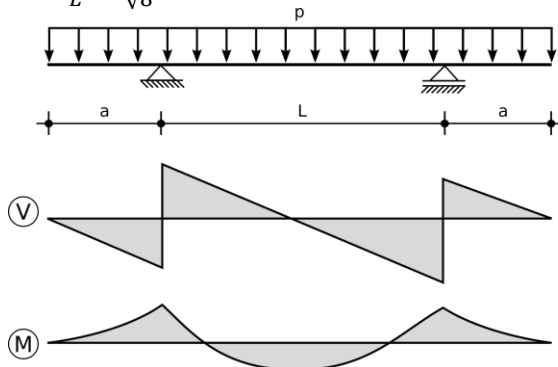
**Ejercicio 5.8**



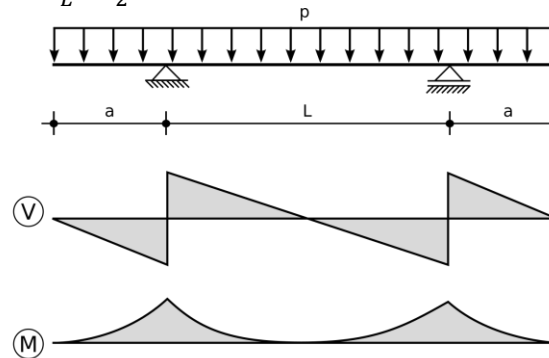


**Ejercicio 5.9 (Avanzado)**

b)  $\frac{a}{L} = \frac{1}{\sqrt{8}}$



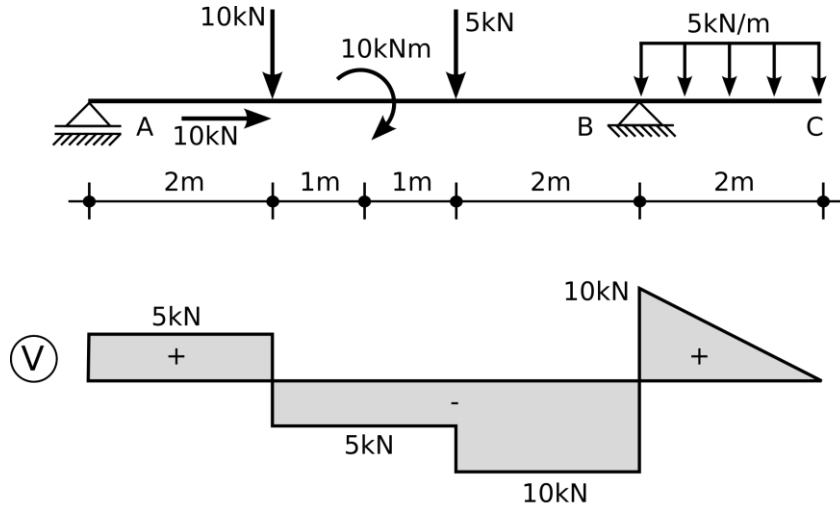
c)  $\frac{a}{L} = \frac{1}{2}$



d) Para el caso en b) se coloca PNC 14 y en c) se coloca PNC 20.

**Ejercicio 5.10 (Avanzado)**

a) y b)

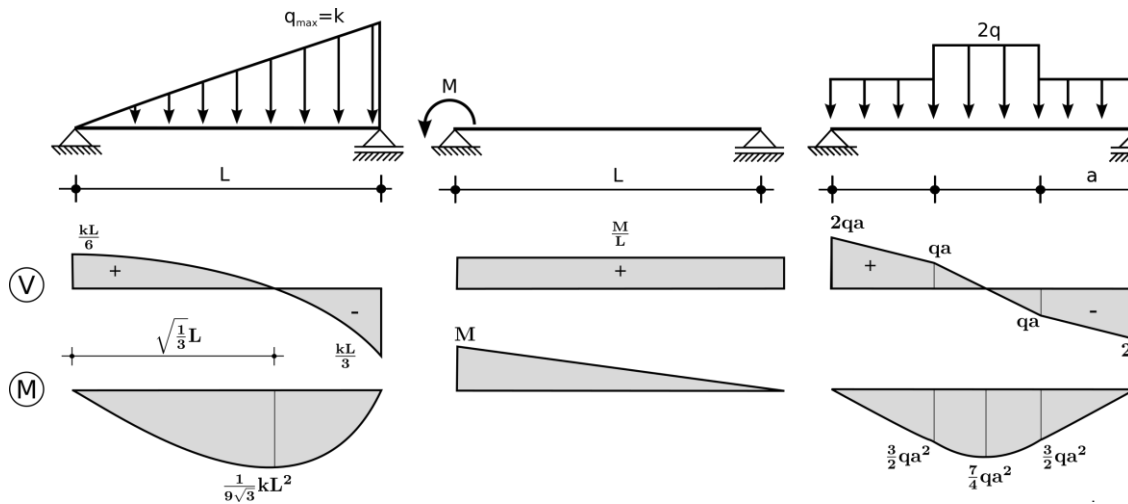


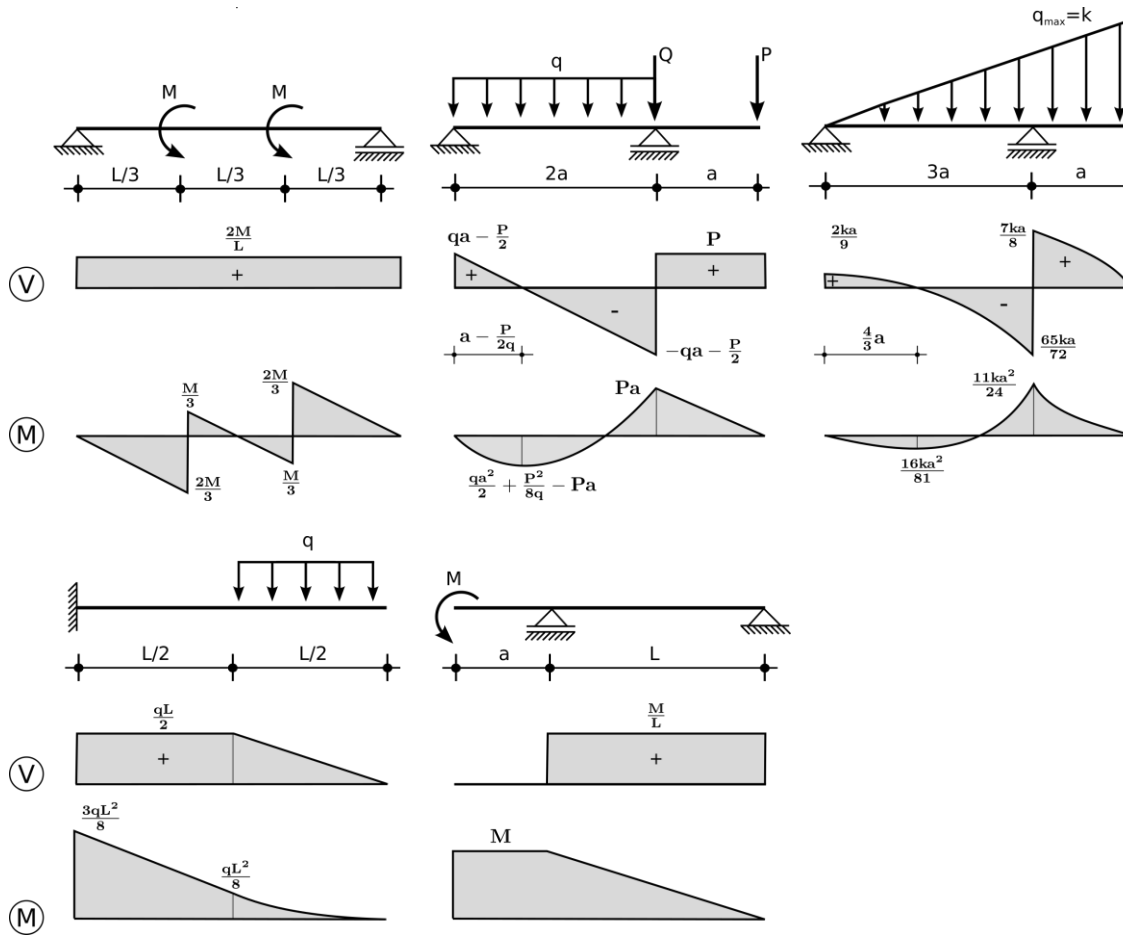
c) Se dimensiona en presoflexión (directa más momento):  $\sigma = \frac{N}{A} + \frac{M}{W} \leq$

$\sigma_{adm}$

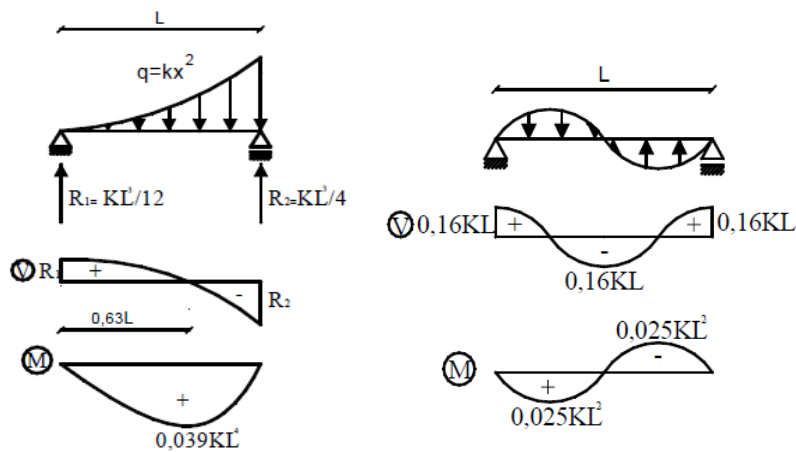
Se coloca un perfil PNI 16.

**Ejercicio 5.11 (Complementario)**

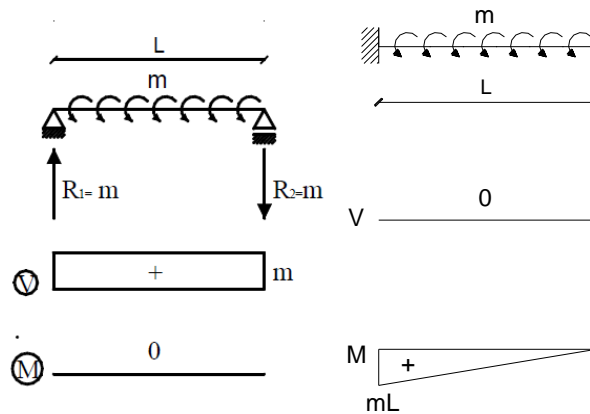




**Ejercicio 5.12 (Conceptual)**







Los últimos dos casos no cumplen el Teorema Fundamental de Vigas.

### **Ejercicio 5.13 (Conceptual)**

Para ambos casos se considera el origen de coordenadas en el extremo izquierdo de cada viga. Para la viga en ménsula sometida a una carga distribuida uniforme la variación de la altura es

$$h(x) = \sqrt{\frac{3q}{b\sigma_0}}(L - x)$$

Para la viga simplemente apoyada sometida a una carga distribuida uniforme la variación de la altura es

$$h(x) = \sqrt{\frac{3q}{b\sigma_0}}(L - x)x$$