Exercice 1

Réactions d'appui

$$Y_A + Y_C - \frac{ql}{2} = 0 \iff Y_A = -\frac{ql}{8}$$

$$Y_C \times l - \frac{ql}{2}\left(l + \frac{l}{4}\right) = 0 \iff Y_C = \frac{5ql}{8}$$

Expressions efforts internes

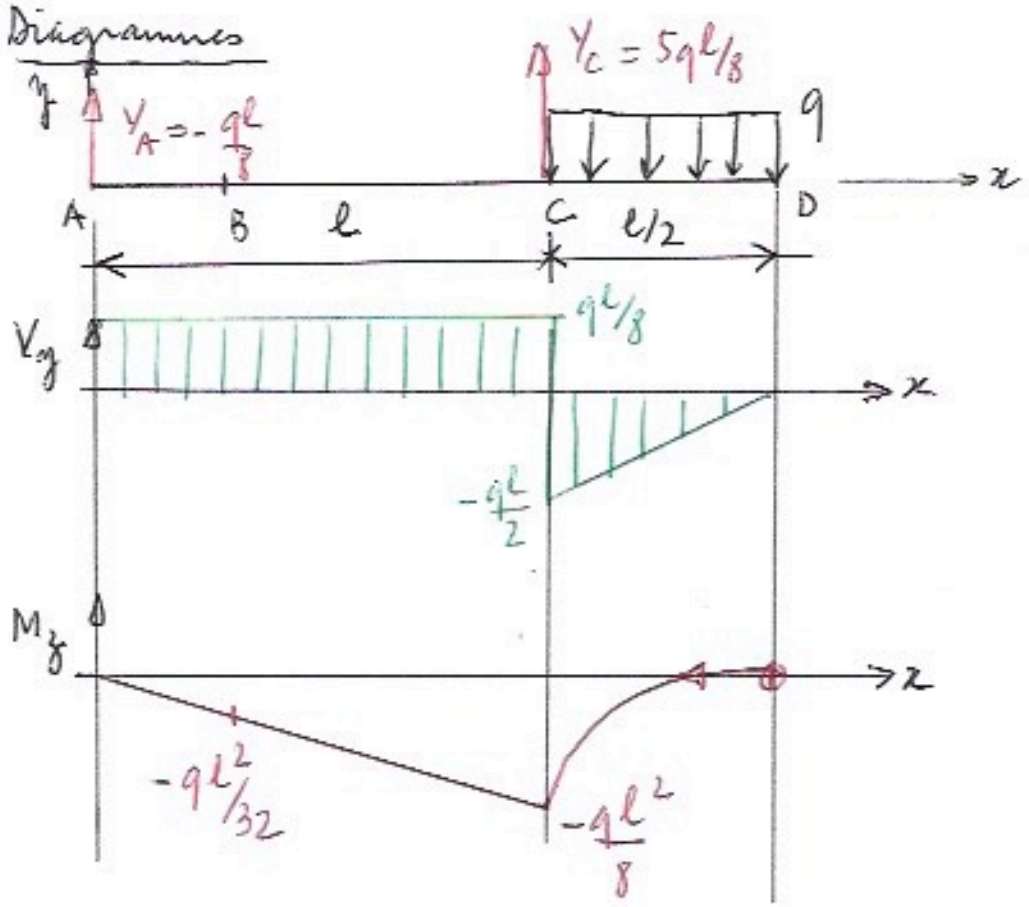
$$V_{yAC}(x) = \frac{ql}{8} \qquad V_{yCD}(x) = -q\left(\frac{3l}{2} - x\right)$$

$$M_{zAC}(x) = -\frac{ql}{8}x \qquad M_{zCD}(x) = -\frac{q}{2}\left(\frac{3l}{2} - x\right)^2$$

Moments fléchissants en A, B, C et D

$$M_{zA} = 0 \qquad M_{zB} = -\frac{ql^2}{32} \qquad M_{zC} = -\frac{ql^2}{8} \qquad M_{zD} = 0$$

Diagrammes



A.N. $Y_A = -1$ kN $\quad Y_C = 5$ kN

$M_{zB} = -1$ kN.m $\quad M_{zC} = -4$ kN.m

Exercice 2

Réactions d'appui

$$Y_A + Y_C - \frac{3F}{2} = 0 \iff Y_A = \frac{F}{2}$$

$$Y_C \times l - \frac{Fl}{4} - \frac{F}{2} \times \frac{3l}{2} = 0 \iff Y_C = F$$

Expressions des efforts internes

$$V_{yAB}(x) = -\frac{F}{2} \qquad V_{yBC}(x) = \frac{F}{2}$$

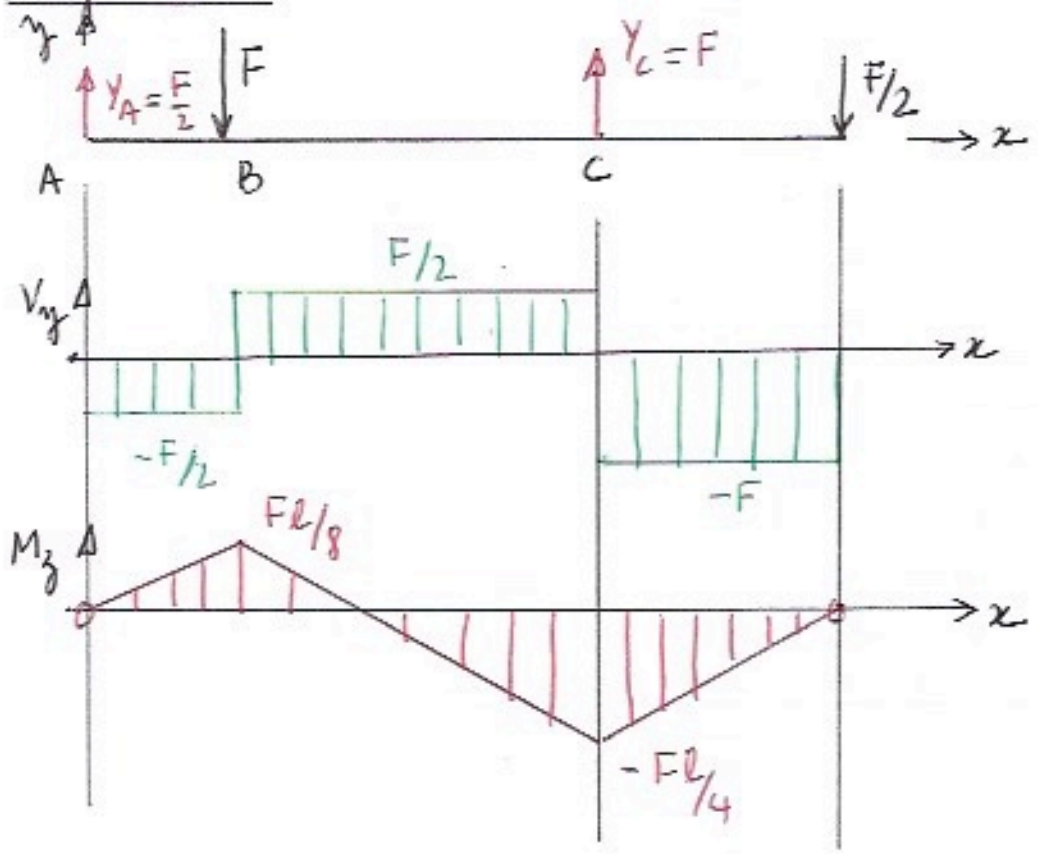
$$M_{zAB}(x) = \frac{F}{2}x \qquad M_{zBC}(x) = -\frac{F}{2}x + \frac{Fl}{4}$$

$$V_{yCD}(x) = -\frac{F}{2} \qquad M_{zCD}(x) = \frac{F}{2}\left(x - \frac{3l}{2}\right)$$

Moments fléchissants en A, B, C, et D

$$M_{zA} = 0 \qquad M_{zB} = \frac{Fl}{8} \qquad M_{zC} = -\frac{Fl}{4} \qquad M_{zD} = 0$$

Diagrammes



A.N.

$Y_A = 4\ kN$ $\qquad Y_C = 8\ kN$

$M_{zA} = 0$ $\qquad M_{zB} = 4\ kN.m$ $\qquad M_{zC} = -8\ kN.m$

Exercice 3

Réactions d'appui

$$Y_A = \frac{F}{2} - \frac{ql}{8} \qquad Y_C = F + \frac{5ql}{8}$$

$Y_A = 3\ kN$ $\qquad Y_C = 13\ kN$

Moments fléchissants

$$M_{zB} = \frac{Fl}{8} - \frac{ql^2}{32} \qquad M_{zC} = -\frac{Fl}{4} - \frac{ql^2}{8}$$

$M_{zB} = 3\ kN.m$ $\qquad M_{zC} = -12\ kN.m$

Diagramme M_z