Actividad 2:

b) Calcular la deflexión máxima, aplicando la ecuación elástica.

$$M(x) = -353.31x + 680\langle x-12\rangle - 507.42\langle x-33\rangle$$

Sabemos que:

$$EI\frac{d^2y}{dx^2} = M(x)$$

Por lo tanto:

$$EI\frac{dz}{dx} = \int M(x)\,dx$$

$$EI\frac{dz}{dx} = -353.31\frac{x^2}{2} + 680\frac{\langle x-12\rangle^2}{2} - 507.42\frac{\langle x-33\rangle^2}{2} + C_1$$

$$\therefore EI\,y(x) = -353.31\frac{x^3}{6} + 680\frac{\langle x-12\rangle^3}{6} - 507.42\frac{\langle x-33\rangle^3}{6} + C_1x + C_2$$

Conocemos:

$E = 29.007$ Mpsi $\quad \therefore EI = 12.814\times10^6$

$$I = \frac{\pi r^4}{4} = \frac{\pi(0.75)^2}{4} = 0.4417$$

$$z(x) = \frac{1}{12.814\times10^6}\left[-353.31\frac{x^3}{6} + 680\frac{\langle x-12\rangle^3}{6} - 507.42\frac{\langle x-33\rangle^3}{6} + C_1x + C_2\right]$$

Aplicando condiciones de frontera

$z(0) = 0$

$z(48) = 0$

$\therefore$ $C_1 = 31387$

$C_2 = 0$