

Tarea 7.

$$1. \quad w = 5.5 \text{ libras}$$

$$k = 20 \text{ lb/pie}$$

$$m = \frac{w}{g} = \frac{5.5}{32} = 0.171875$$

$$\text{Periodo} = T = 2\pi \sqrt{\frac{m}{k}}$$

$$T = 2\pi \sqrt{\frac{(0.171875)}{20}} = \underline{\underline{0.5824 \text{ seg}}}$$

2.

$$m = 4.5 \text{ Kg}$$

$$k = 18.5 \text{ Kg/m}$$

T = ?

$$T = 2\pi \sqrt{\frac{4.5}{18.5}}$$

$$T = \underline{\underline{3.10 \text{ seg}}}$$

3.

$$m = 35 \text{ Kg}$$

$$f = \frac{4}{\pi} \text{ ciclos}$$

$$T = \frac{1}{f} = \frac{1}{4/\pi} = \frac{\pi}{4}$$

$$\frac{\pi}{4} = 2\pi \sqrt{\frac{35}{k}}$$

$$\frac{1}{8} = \frac{\sqrt{35}}{\sqrt{k}}$$

$$\sqrt{k} = 8\sqrt{35}$$

$$k = \underline{\underline{2,240 \text{ Kg/m}}}$$

4.

$$W = 30 \text{ libras}$$

$$M = \frac{30}{32}$$

$$x = 5 \text{ pulgadas} = \frac{5}{12} \text{ pie}$$

$$32$$

$$30 = \frac{5}{12} k$$

$$k = 72 \text{ lb/pie}$$

$$m \frac{d^2 x}{dt^2} = -kx$$

$$\frac{30}{32} x'' = -72x$$

$$x'' + \frac{384}{5} x = 0$$

$$m^2 + \frac{384}{5} = 0 \quad m_{1,2} = \pm \sqrt{\frac{384}{5}} i$$

$$x(t) = C_1 \cos \sqrt{\frac{384}{5}} t + C_2 \sin \sqrt{\frac{384}{5}} t \quad x'(t) = -\frac{\sqrt{384}}{5} C_1 \sin \sqrt{\frac{384}{5}} t$$

$$+ \frac{\sqrt{384}}{5} C_2 \cos \sqrt{\frac{384}{5}} t$$

$$x(0) = 5 \quad x'(0) = 3$$

$$5 = C_1 \cos(0) + C_2 \sin(0)$$

$$C_1 = 5$$

$$3 = \frac{\sqrt{384}}{5} C_2 \cos(0)$$

$$C_2 = 3 \sqrt{\frac{5}{384}}$$

$$x(t) = 5 \cos \sqrt{\frac{384}{5}} t + 3 \sqrt{\frac{5}{384}} \sin \sqrt{\frac{384}{5}} t$$