1. What is the period of a pendulum w/ string L = 20cm?

↳ 0.2m

$T_p = 2\pi\sqrt{\frac{L}{g}}$

$T_p = 2\pi\sqrt{\frac{0.2\,m}{9.8\,m/s^2}}$

$T_p = 0.9\,s$

$f = ? = \frac{1}{T} = 1.1\,Hz$

Nov 25-8:06 AM

You take your pendulum to Mars and you have a new frequency of 0.68 Hz

find g_{mars}

$T = \frac{1}{f} = 1.47\,s$

$\frac{1.47\,s}{2\pi} = \frac{2\pi\sqrt{\frac{0.2}{g_{mars}}}}{2\pi}$

$0.234^2 = \left(\sqrt{\frac{0.2}{g}}\right)^2$

$\frac{0.0548}{1} = \frac{0.2}{g}$

$\frac{0.0548\,g}{0.0548} = \frac{0.2}{0.0548}$

$g = 3.65\,m/s^2$

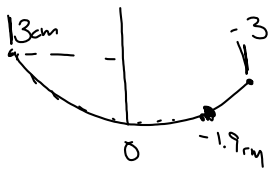
Nov 25-8:19 AM

You initially displaced your pendulum 3cm. Find it's location after 2sec.

$x(t) = A\cos(2\pi f t)$

$x(2) = 3cm \cdot \cos(2\pi(0.68)(2sec))$

$x(2) = -1.9cm$



Nov 25-8:23 AM

You have a pendulum L = 45cm on Earth initially displaced 8cm. Find it's location after 2sec.

$x(t) = A\cos(2\pi f t)$

↓

find $f \rightarrow \frac{1}{T_p}$

$T_p = 2\pi\sqrt{\frac{.45}{9.8}}$

$T_p = 1.346s \quad f = 0.743Hz$

$x(2) = 8cm\cos(2\pi \cdot 0.743 \cdot 2s)$

$\simeq -7.9cm$

Nov 25-8:29 AM

A pendulum has an initial displacement of 10cm & is found to be at a position of 2cm after 1.5s.

find L. $x(t) = A\cos(2\pi f t)$

$T_p = 2\pi\sqrt{\frac{L}{g}}$

$x(1.5) = \frac{2cm}{10cm} = \frac{10cm\cos(2\pi f(1.5))}{10cm}$

$0.2 = \cos(2\pi f(1.5))$

$\cos^{-1}(0.2) = 2\pi f 1.5$

$\frac{1.37}{9.42} = \frac{9.42\,f}{9.42}$

$f = 0.14Hz$

$T_p = 6.88s$

$\frac{6.88}{2\pi} = \frac{2\pi\sqrt{\frac{L}{9.8}}}{2\pi}$

$(1.09)^2 = \left(\sqrt{\frac{L}{9.8}}\right)^2$

$1.198 = \frac{L}{9.8}$

$L = 11.7m$

Nov 25-8:35 AM

Springs

a 75g mass is placed on a spring & comes to rest @ a displacement of 3cm. It is then further displaced 6cm. Find it's f.

$F_g = F_s = -kx$

$mg = 0.075 \cdot 9.8$

$= 0.735N = -k(-0.03m)$

$k = 24.5\,N/m$

$T_s = 2\pi\sqrt{\frac{m}{k}}$

$= 2\pi\sqrt{\frac{.075kg}{24.5N/m}}$

$T_s = 0.35s$

$f = \frac{1}{T} = 2.88Hz$

Nov 25-8:46 AM