

University Physics 1A

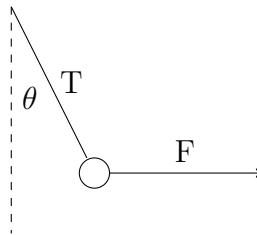
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Test Review

Example

A pendulum bob with a weight of 1N is held at an angle θ from the vertical by a 2N horizontal force F as shown. The tension in the string supporting the pendulum bob is:



$$\begin{aligned}F_{net\ y} &= 0 \\ &= T \cos(\theta) - mg \\ F_{net\ x} &= F - T \sin(\theta) = 0 \\ T^2 &= T^2 \sin^2(\theta) + T^2 \cos^2(\theta) \\ &= (mg)^2 + (F)^2 \\ &= 1^2 + 2^2 = 5N \\ T &= \sqrt{5}\end{aligned}$$

Example

A UFO moves in one dimension according to the equation $\vec{v}(t) = 4.00 - 9.00t^2$ for $t \geq 0$.

1. What are the SI units of 4.00 and the SI units of 9.00 in this equation?

$$m/s \text{ and } m/s^3$$

2. At what time is the UFO momentarily at rest?

$$\begin{aligned} 0 &= 4 - 9t^2 \\ 9t^2 &= 4 \\ t^2 &= \frac{4}{9} \\ t &= \pm \frac{2}{3} \end{aligned}$$

3. Calculate the acceleration of the UFO at $t = 3.00\text{s}$.

$$\begin{aligned} a &= \frac{d\vec{v}}{dt} \\ &= 0 - 9(2t) \\ &= (-9)(2)(3) \\ &= -54 \frac{m}{s^2} \end{aligned}$$

4. Suppose the location of the UFO at time $t = 0$ is $x(0) = -7.00\text{m}$. Write the position function $\vec{x}(t)$.

$$\begin{aligned} \vec{x}(t) &= 4t - \frac{9t^3}{3} + c \\ \vec{x}(0) &= -7 = 4(0) - 3(0)^3 + c \\ c &= -7 \\ \vec{x}(t) &= 4t - 3t^3 - 7 \end{aligned}$$

Reminders and Homework

Complete the homework on TheExpertTA and WebAssign.

There will be a test tomorrow in Gosnell 3305.

Remember to bring the Activities Manual.

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at alvin@omgimanerd.tech