UNIVERSITY OF ALABAMA

Department of Physics and Astronomy

PH 125 / LeClair   13 Jan 2009

Quiz 1: Math and units refresher

Instructions:

1. Answer both questions below. Both have equal weight.
2. Express your answer with the appropriate units and significant digits
3. Show your work for full credit.

1. The position x as a function of time t of a particle traveling along a straight line can be described by the function

$$x(t) = 2.0 + 4.0t - 4.9t^2$$

with $t \geq 0$, x in meters, and t in seconds. At what time is the position maximum? **No sketch is required.**

Double Check possibilities: what about the second derivative?

2. According to Abe Simpson,

> The metric system is the tool of the devil! My car gets forty rods to the hogshead and that's the way I likes it.

If one hogshead is approximately $239\,\text{L}$, one rod is approximately $5.03\,\text{m}$, and $1\,\text{km} = 10^3\,\text{m}$, what is his mileage in km/L? Note that $30\,\text{miles/gallon} \approx 12.75\,\text{km/L}$. **No sketch is required.**

Double Check possibilities: verify your unit conversions explicitly. Should the answer be much larger or smaller than the mileage for an average car?