Phys251 Fall 2002 Quiz 1 on Chapters 1,2
Show your work to get partial credit.

Name: Key
SSN: ________________

1. (1 pt) The *System International* uses which of the following system of units:
   (a) CKS  (b) MGS  (c) CGM  (d) MKS  (e) CBS  (f) NBA

2. (1 pt) If \( x \) has dimensions of length, \( A \) has dimensions of area, \( t \) has dimensions of time, \( v \) has dimensions of length per time, and \( a \) has dimensions of length per time squared, which of the following equations is dimensionally *incorrect*?
   (a) \( x = vt \)  (b) \( x = \frac{1}{2} at^2 \)  (c) \( v/A \)  (d) \( A - x^2 = t \)

3. (1 pt) How many significant figures are there in the number 0.43790?

   5

4. (1 pt) What is \( \frac{2.2 \times 6.55}{2} \) using correct significant figures and in scientific notation?

   \[ 1.441 \times 10^1 \Rightarrow 1.4 \times 10^1 \]

5. (1 pt) Convert 3.456 inches to centimeters keeping the correct number of significant figures. (1 inch = 2.54 cm)

   \[ 3.456 \text{ in} \left( \frac{2.54 \text{ cm}}{1 \text{ in}} \right) \]

   \[ = 8.78 \text{ cm} \]

   but

   8.778 cm also ok in this case because 2.54 is exact

   ie. \( \frac{2.540}{4 \text{ sig figs}} \)
The following applies to questions 6, 7, and 8.

A glider moves along an inclined air track with a constant acceleration $a$ (which could be negative). It is projected from the start of the track ($x=0$) with an initial velocity $v_0$. At time $t = 3.00$ s, it is at $x = 90.0$ cm and is moving along the track at velocity $v = 25.0$ cm/s. The $x$-axis lies along the inclined track; just consider this a one-dimensional problem (use 1-D equations with constant acceleration).

6. (2 pts) Draw the position $x$ and velocity $v$ as functions of time $t$ (1 point each correct graph).

\[ x_0 = 0 \]
\[ v_0 = v_0 \]
\[ a \cdot t = 3.00 \text{ s}, \quad x = 90.0 \text{ cm}, \quad v = 25.0 \text{ cm/s} \]

7. (2 pts) Find the initial speed $v_0$.

\[ \Delta x = \frac{1}{2} (v_0 + v) \Delta t \]
\[ v_0 + v = \frac{2 \Delta x}{\Delta t} \]
\[ v_0 = \frac{2 \Delta x}{\Delta t} - v = \frac{2(90.0 \text{ cm})}{3.00 \text{ s}} - 25.0 \text{ cm/s} \]
\[ v_0 = 25.0 \text{ cm/s} \]

8. (1 pt) Find the acceleration $a$.

\[ v = v_0 + at \]
\[ \Rightarrow a = \frac{v - v_0}{t} = \frac{25.0 - 35.0 \text{ cm/s}}{3.00 \text{ s}} \]
\[ a = -3.33 \text{ cm/s}^2 \]