

Homework 1:

Due by 4:00, Wednesday, 01/21

Questions with asterisk symbols are graded based on the “effort”, rather than correctness.

1. Suppose IPFW changes the length of your physics lecture to a “micro-century”. How many minutes is this class? Is it longer or shorter than your current physics class? Show your work or explain your method.

2. \* Can we compare two quantities with same unit but different significant figures? Give out your reasons.

3. Given that ...

Energy, E, is measured in Joules  $J = \frac{\text{kg}\cdot\text{m}^2}{\text{s}^2}$

Acceleration, a, is measured in  $\frac{\text{m}}{\text{s}^2}$ ,

Momentum, p, is measured in  $\frac{\text{kg}\cdot\text{m}}{\text{s}}$ ,

Length, x, is measured in m,

Mass, M, is measured in kg, and

Time, t, is measured in s.

Using dimensional analysis of units, determine which of the below equations are invalid.

(a)  $E^2 = p^2 \frac{x^2}{t^2} + M \frac{x^2}{t^2}$

(b)  $E = p \cdot a \cdot t$

(c)  $x = \sqrt{p^2 \cdot a^2 \cdot \frac{t^2}{E \cdot M}}$

SHOW YOUR WORK.