Homework One

The Invisible College

September 7, 2015

> Git is a distributed revision control system with an emphasis on speed, data integrity, and support for distributed, non-linear workflows. Git was initially designed and developed by Linus Torvalds for Linux kernel development in 2005, and has since become one of the most widely adopted version control systems for software development.

Units, Constants and Conversions

Evaluate the following. Express without prefixes and in the simplest SI unit(s) possible.

$$\frac{(6\ \mathrm{kg{\cdot}m/s})^2}{2\ \mathrm{J}}$$

$$(4\ \mathrm{mA})(3\ \mathrm{ns})(2\ \mathrm{V})$$

$$\frac{e}{m_e}\sqrt{\frac{k_e}{G}}$$

$$3.1\ \mathrm{eV}$$

$$\frac{65\ \mathrm{miles}}{\mathrm{hour}}$$

$$11\ \mathrm{cm}^3$$

ESTIMATION

Estimate the number of dirty socks on Sarah Lawrence campus.

Estimate the number of pineapples that could fit into the Tea House.

Knowing it takes 8 minutes for light to reach the earth from the sun, estimate the diameter of the sun.

DIMENSIONS

State the dimension of the following in terms of the SI base quantities' dimensions.

1 Joule

1 Coulomb

1 Newton

Consider a column of liquid with volume (V) and surface area (A). The pressure due to the fluid (P) is a function of depth below the surface (y). Here g is earth's gravity constant.

$$P = \rho g y$$

Determine the dimensions and SI units of the following quantities

P

ρ

g

$\frac{\Delta P}{\Delta y}$

$P \cdot A$

$P \cdot V$

$\rho \cdot V$

VECTORS

$\overrightarrow{p} = 3\hat{x} + 4\hat{y}$ $\overrightarrow{q} = -5\hat{x} + 12\hat{y}$

Given the vectors above, evaluate the following terms:

$|\overrightarrow{p}|$

q

$\hat{q}$

$\overrightarrow{p} - 2\overrightarrow{q}$

$|3\overrightarrow{p} - \overrightarrow{q}|$

$\overrightarrow{p} \cdot \overrightarrow{q}$

$|\overrightarrow{p} \times \overrightarrow{q}|$

FUNCTIONS

$f(x) = -2x + 3$ $\qquad$ $g(x) = -x^2 - 8x + 15$

The functions $f(x)$ and $g(x)$ are given above. Draw both functions on the same graph. Include the x and y intercept for each function and their points of intersection.

LaTeX

Download a distribution of LaTeX and a bibliographic manager like BibTeX.