Potential Difference

1) Voltage is defined as the energy per unit charge
   a) $V = \frac{E_p}{q}$
2) Voltage is defined as the Electric Field * meter
   a) $V = \vec{E} \cdot d$

Consider Voltage to be "pressure" on electric charges in space. When exposed to this pressure, charges can move and do work for us.

Voltage = Electric Potential = potential difference = potential = electro-motive force (emf).

The SI unit is the Volt (V) which is J/C.

Potential difference = $\Delta V = V_{atA} - V_{atB}$

A $6\mu C$ charge is sitting in space.
Calculate the voltage at a point 3m away. And a point 5m away at an angle of 280°.

An electron is placed at a plate whose voltage is -150V. How much potential energy does the electron have?

What is the voltage between a point 3.0m form a 50 μC charge and a point 5.0m from the same charge?

An electron is accelerated from rest to what velocity when moving through a potential difference of 500V?

Hint: $1.33 \times 10^7 m/s$

A proton moving at $3.0 \times 10^5 \ \frac{m}{s}$ enters a region of voltage, it exits at $2.0 \times 10^4 \ \frac{m}{s}$. What potential difference did the proton move through?

$\vec{E} = \frac{kq}{r^2}$ $E_p = \frac{kq_1q_2}{r}$ $F_e = \frac{kq_1q_2}{r^2}$ $V = \frac{kq}{r}$ $\Delta V = \frac{\Delta E_p}{q}$
