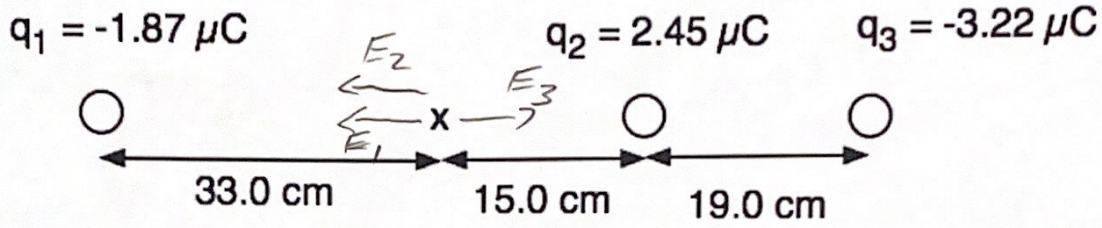
Quiz 18.1D

Three charges are arranged along the x-axis as shown.

a) Find the magnitude and direction of the electric field at the position x.
b) Assume an electron is now located at x. What is the magnitude and direction of the acceleration experienced by the electron (properties of an electron are located on page 1 of your formula sheet).



$$|E_1| = \frac{(9\times10^9)(1.87\times10^{-6})}{.33^2} = 1,545\times10^5,\ -x$$

$$|E_2| = \frac{(9\times10^9)(2.45\times10^{-6})}{.15^2} = 9.8\times10^5,\ -x$$

$$|E_3| = \frac{(9\times10^9)(3.22\times10^{-6})}{.34^2} = 2,51\times10^5,\ +x$$

$$\vec{E}_{TOT} = -E_1 - E_2 + E_3$$

$$= -1,55\times10^5 - 9,80\times10^3 + 2,51\times10^5$$

$$= -8.84\times10^5\ N/C, \text{ or } \boxed{8,84\times10^5\ \tfrac{N}{C},\ -x}$$

$|a| = \frac{qE}{m}$, opposite of $\vec{E}$

$$= \frac{(1,60\times10^{-19})(8.84\times10^5)}{9.11\times10^{-31}} = \boxed{1.55\times10^{17}\ m/s^2,\ +x \text{ dir}}$$