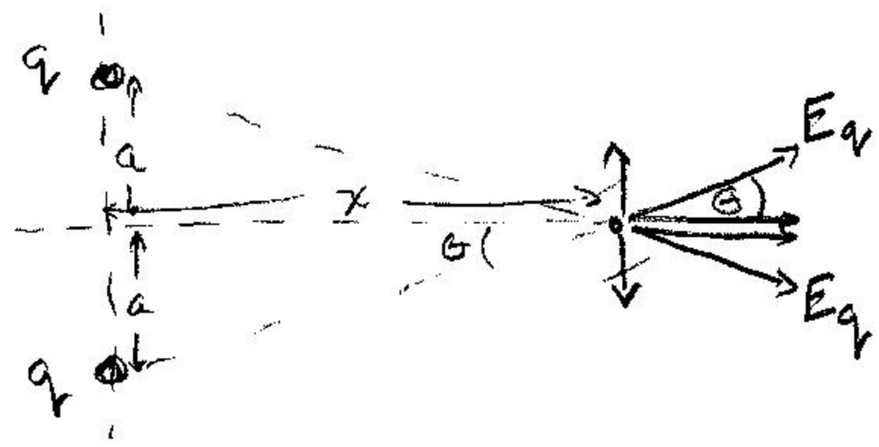
44. GIVEN: q AT $y = a$ ($x = 0$), $y = -a$ ($x = 0$)

SHOW: $E = \dfrac{2kqx}{(x^2+a^2)^{3/2}}$, $E(x \to 0) \approx \dfrac{2kqx}{a^3}$

$E(x \gg a) \approx \dfrac{2kq}{x^2}$



$$E_q = \frac{kq}{x^2+a^2}$$

$$E_{qx} = \frac{kq}{x^2+a^2}\cos\theta$$

E_{qy} CANCELS

$$= \frac{kq}{x^2+a^2}\,\frac{x}{\sqrt{x^2+a^2}} = \frac{kqx}{(x^2+a^2)^{3/2}}$$

$$E_{TOT} = 2\,\frac{kqx}{(x^2+a^2)^{3/2}} \qquad \text{Q.E.D.}$$

$$E(x \to 0) = \frac{2kqx}{(x^2+a^2)^{3/2}} \approx \frac{2kqx}{(a^2)^{3/2}} = \frac{2kqx}{a^3} \qquad \text{Q.E.D.}$$

$$E(x \gg a) = \frac{2kqx}{(x^2+a^2)^{3/2}} \approx \frac{2kq\cancel{x}}{(x^{\cancel{2}})^{\cancel{3/2}\,2}} = \frac{2kq}{x^2} \qquad \text{Q.E.D.}$$

THIS IS THE SAME AS THE ELECTRIC FIELD OF A SINGLE CHARGE $= 2q$. THAT IS WHAT THIS DISTRIBUTION "LOOKS" LIKE FROM A GREAT DISTANCE.

42-381 50 SHEETS EYE-EASE 5 SQUARE
42-382 100 SHEETS EYE-EASE 5 SQUARE
42-389 200 SHEETS EYE-EASE 5 SQUARE
National Brand