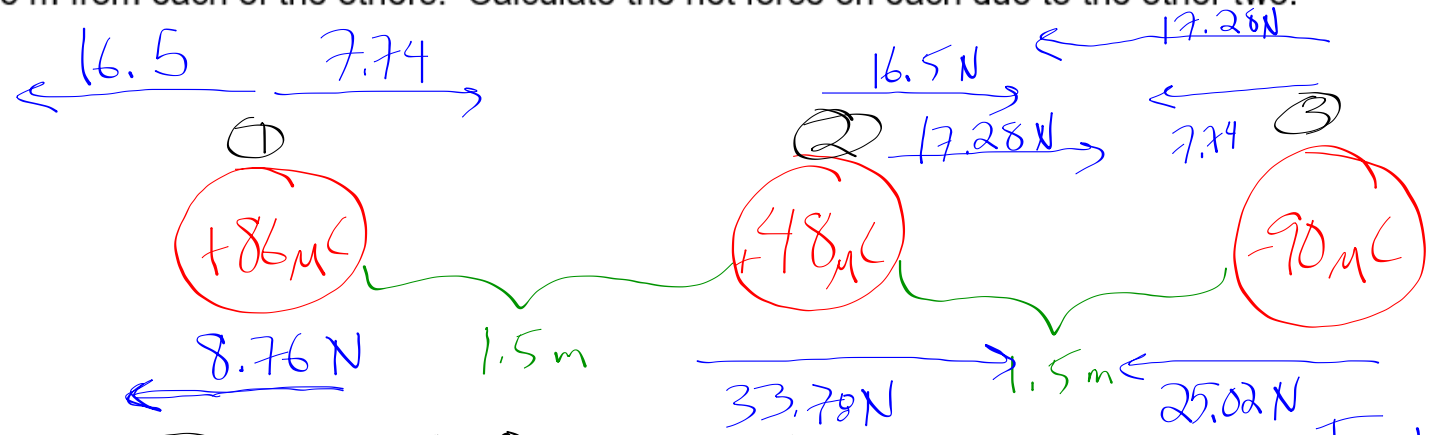
9. Particles of charge +86 μC, +48 μC, and -90 μC are placed in a line. The center one (the +48 μC charge) is 1.5 m from each of the others. Calculate the net force on each due to the other two.



$$F_{1\to 2} = k\frac{Q_1 Q_2}{r^2} = 9e9\,\frac{(86e{-}6)(48e{-}6)}{(1.5)^2} = 16.5\ N$$

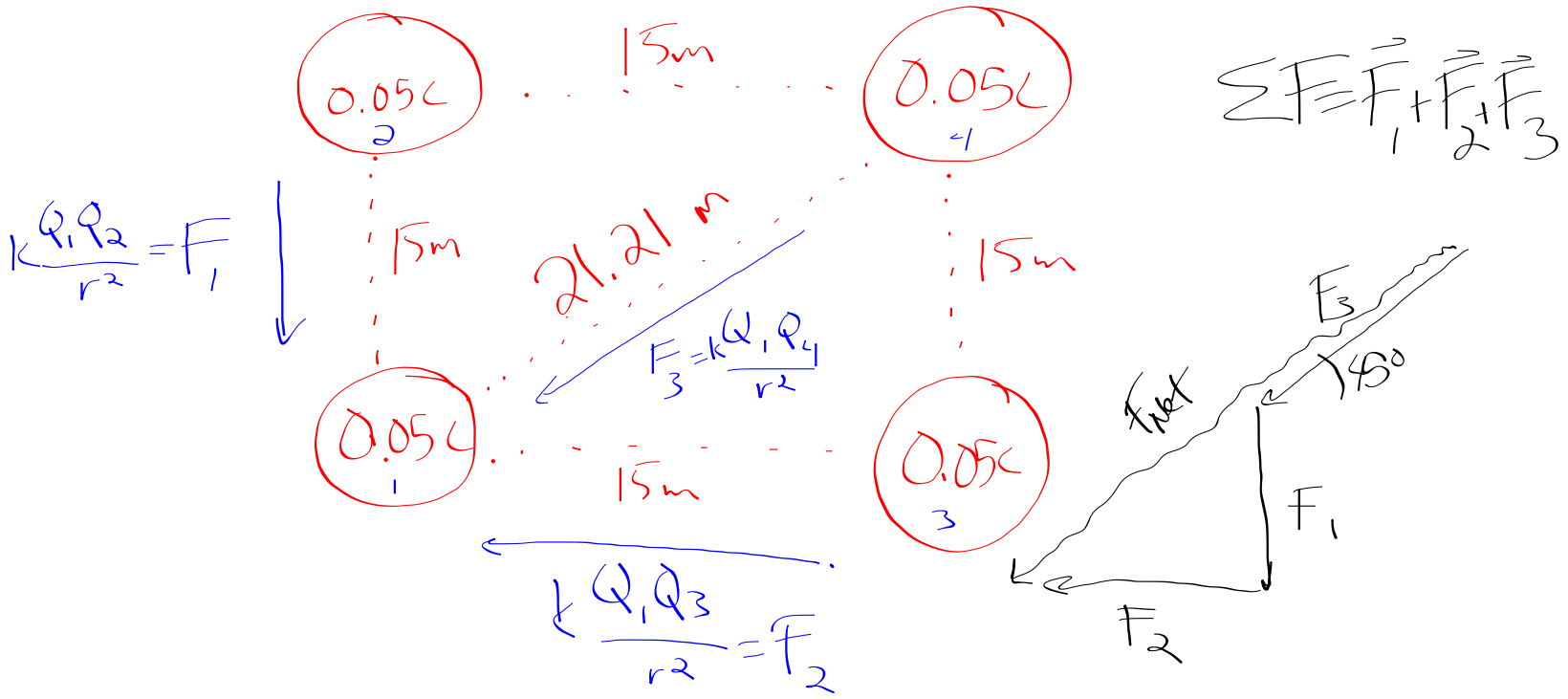
repulsive

$F = k\dfrac{Q_1 Q_2}{r^2}$

$F_{2\to 3} = 17.28\ N$ attractive

$F_{1\to 3} = 7.74\ N$ attractive

10. A charge of 0.0500 C is placed at each corner of a square 15.0 m on a side. Determine the magnitude and direction of the force on each charge. (If this problem seems familiar, it should. We recently did one almost identical to it. For the stamp, nothing short of a complete solution with all supporting work will qualify as an acceptable "attempt" on this problem. Just a word of warning: simple pictures and half-hearted tries with random equations written down aren't going to cut it, at least to earn the stamp.)

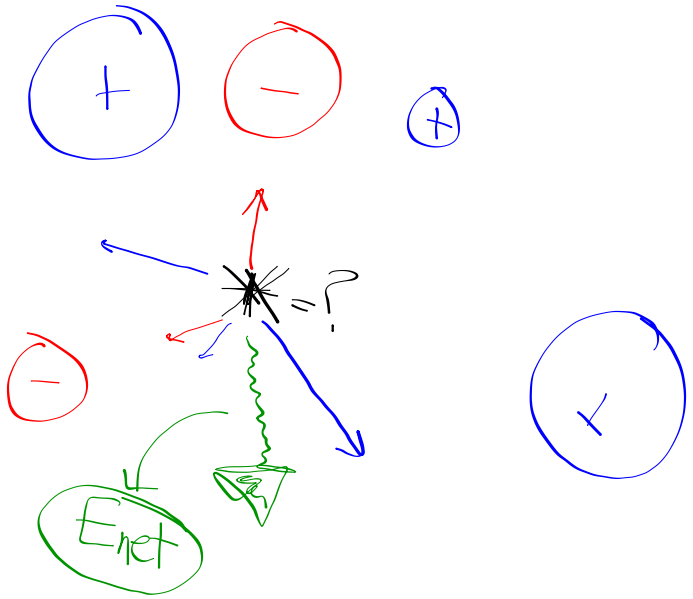


Electric Field:

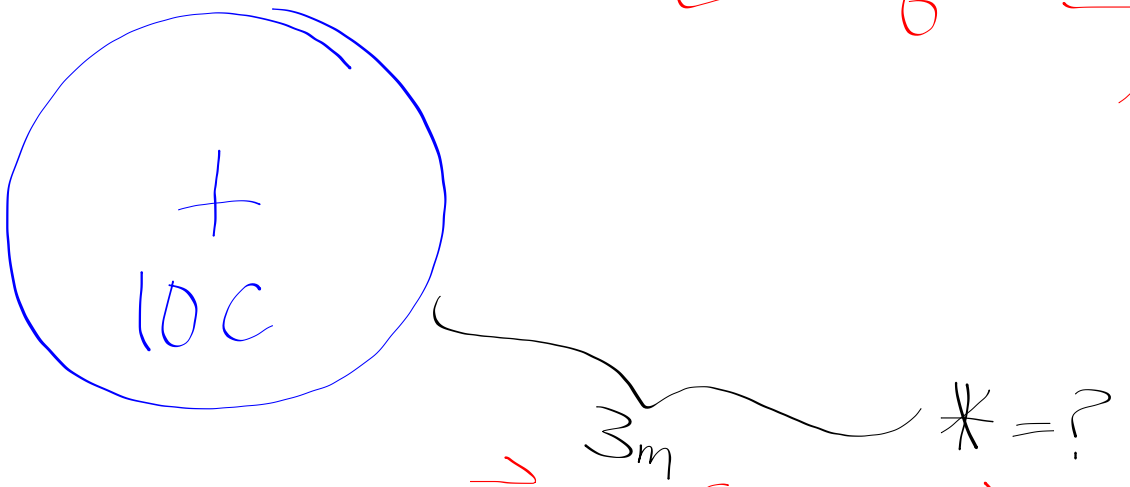
- Tells us the force (size & direction) that a +1 C charge would feel due to the presence of other charges.
- Tells us the force per coloumb of positive charge:

$$E = \frac{F}{q}$$

N/C



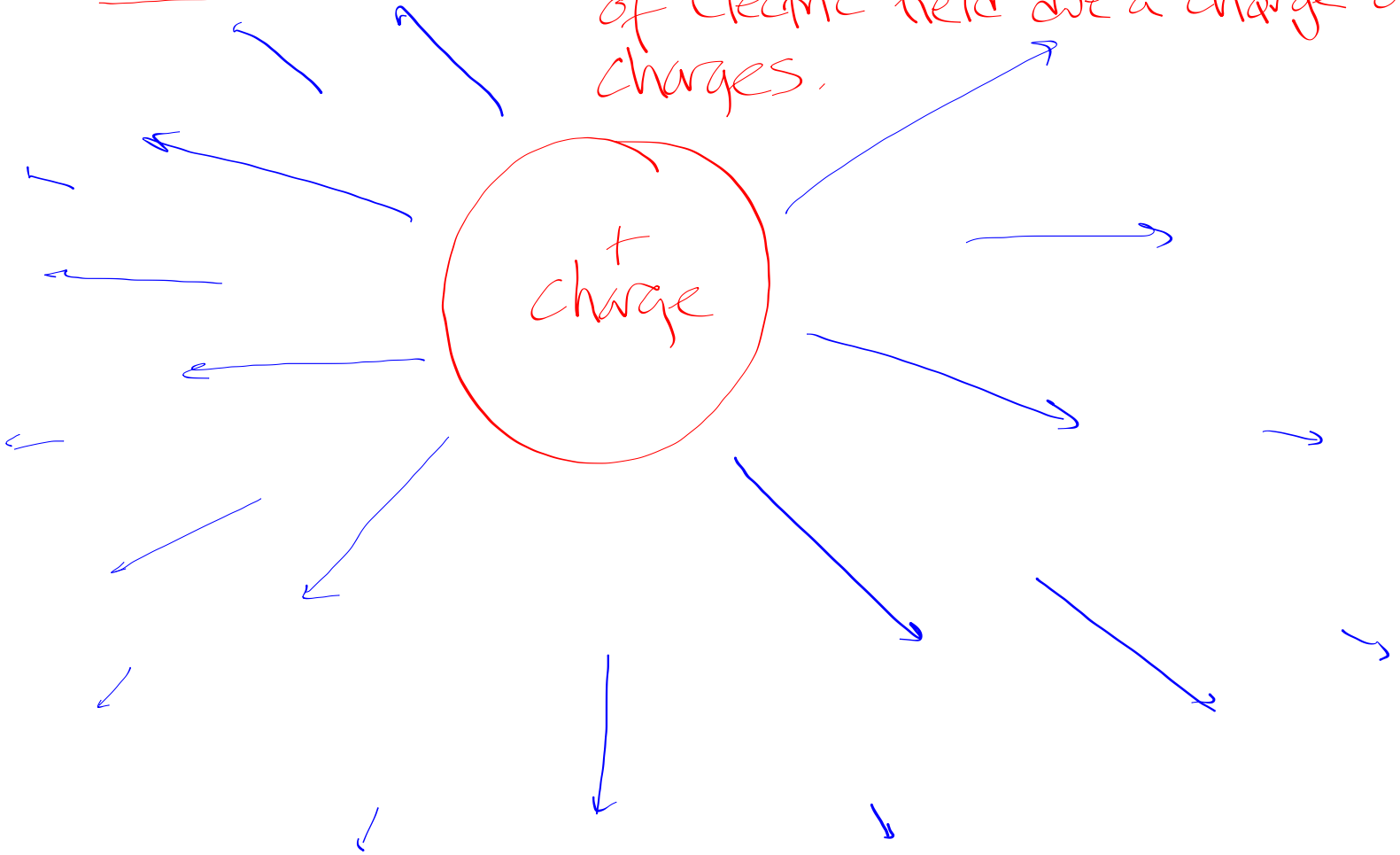
$$E = \frac{F}{q} = \frac{\frac{kQq}{r^2}}{q} = \frac{kQ}{r^2}$$

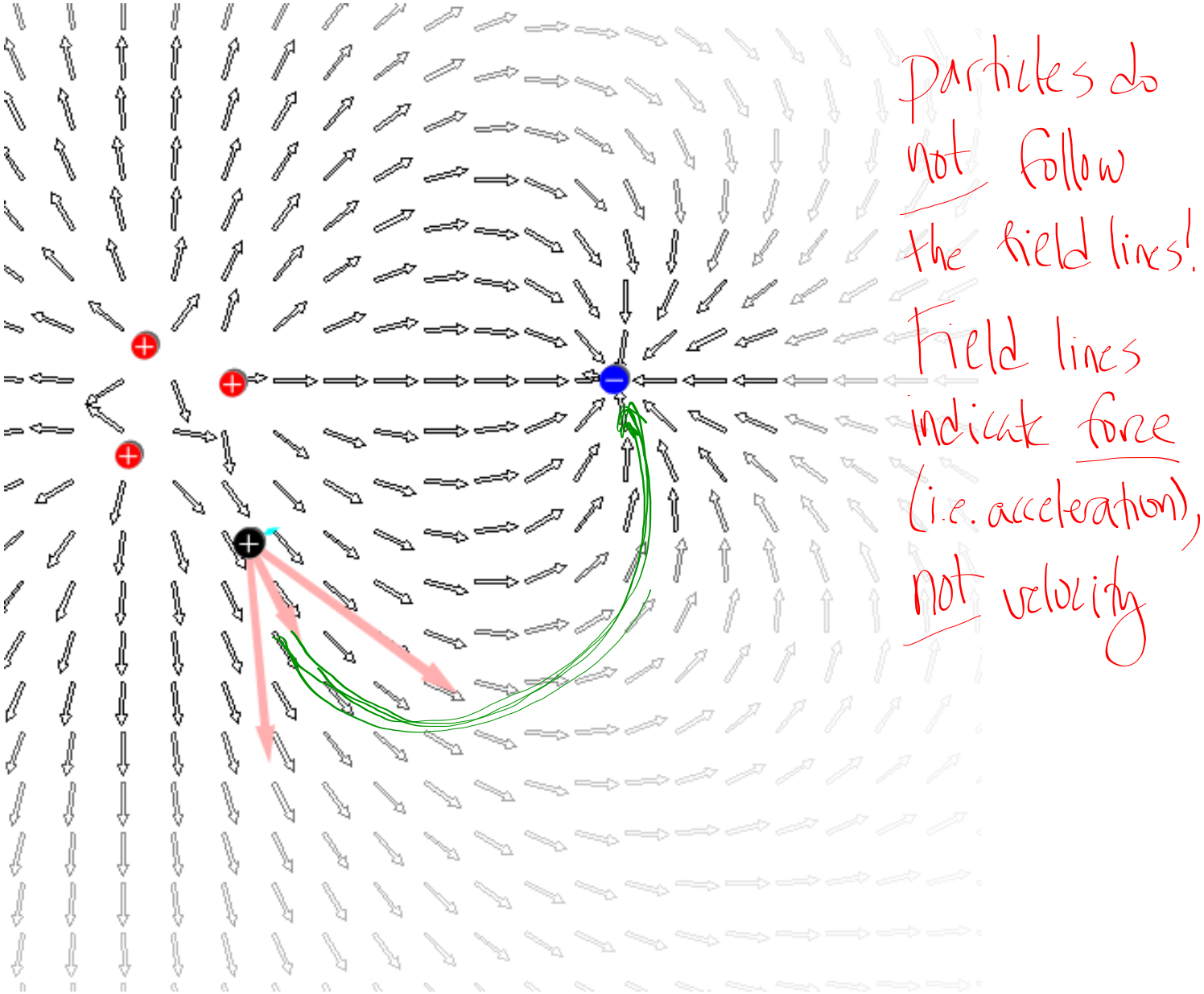


$$\vec{E} = \frac{kQ}{r^2} = \frac{(9e9)(10)}{9} = 1e10\ N/C$$

(sorta down & to the right)

Field Lines: Show direction & relative size of electric field due a charge or charges.




particles do not follow the field lines!
Field lines indicate force (i.e. acceleration), not velocity