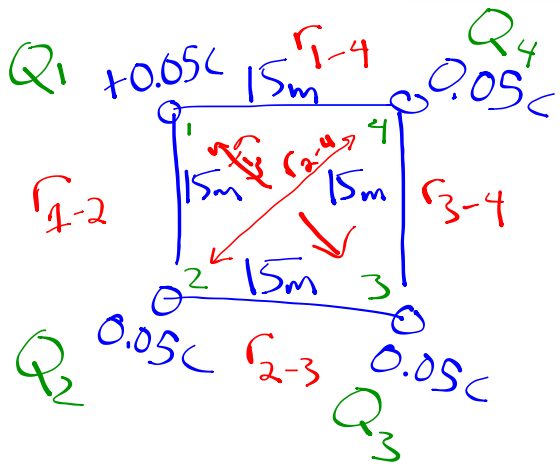
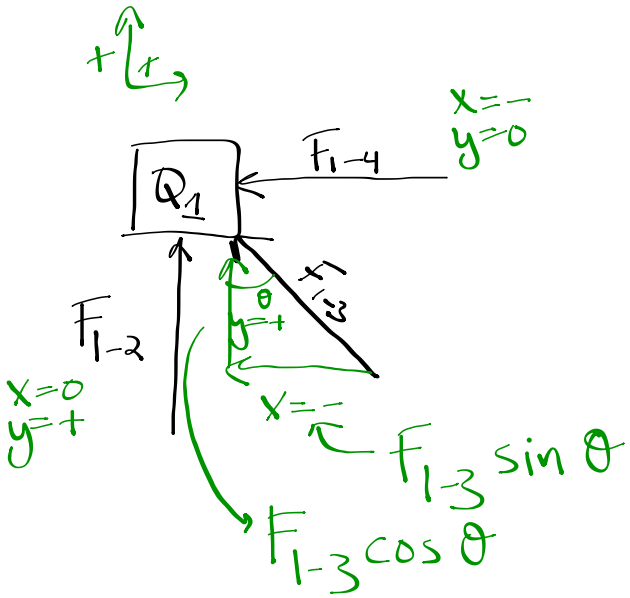
10. A charge of 0.0500 C is placed at each corner of a square 15.0 m on a side. Determine the magnitude and direction of the force on each charge. (If this problem seems familiar, it should. We recently did one almost identical to it. For the stamp, nothing short of a complete solution with all supporting 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.)





$$F_{1-2} = k\frac{Q_1 Q_2}{(r_{1-2})^2}$$

$$F_{1-3} = k\frac{Q_1 Q_3}{(r_{1-3})^2}$$

$$F_{1-4} = k\frac{Q_1 Q_4}{(r_{1-4})^2}$$

$r_{1-3} = \sqrt{15^2+15^2} = 21.2\ m$

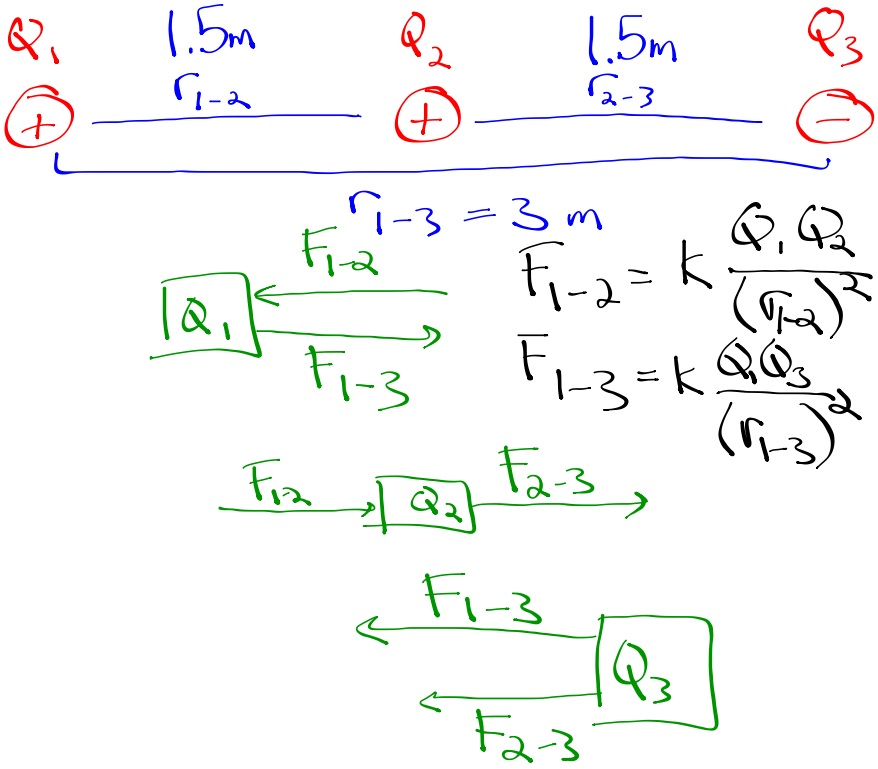
$\theta = 45°$

$$F_x = \overset{(-)}{F_{1-3}}\sin\theta + \overset{(-)}{F_{1-4}}$$

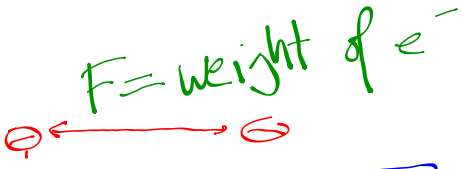
$$F_y = F_{1-2} + F_{1-3}\cos\theta$$

$$F = \sqrt{F_x^2 + F_y^2} \qquad \theta = \tan^{-1}\frac{F_y}{F_x}$$

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.



7. How close must two electrons be if the electric force between them is equal to the weight of either at the earth's surface?



$$F = \boxed{k\frac{Q_1Q_2}{r^2}} = \text{weight } e^- = \boxed{mg}$$