Extra Credit. The E-FIELD due to ***POINT CHARGES*** (4 PTS).

Two ***point-charges*** sit still at known locations within an x-y coordinate system of a laboratory.

A researcher places an instrument called a 'field detector' at the origin (0,0) of this coordinate system. She is interested in measuring the electric field at that precise location.

The two point charges are as follows:

Name	Charge	x-Coordinate	y-Coordinate	Ordered Pair
Q_1	-6 Coulombs	+3 meters	+5 meters	(3,5)
Q_2	+4 Coulombs	-8 meters	+4 meters	(-8,4)

Location of Interest ('Field Point'): (0,0)

Note: All coordinates are measured and given in **meters** (not centimeters); similarly, the (enormous) charge magnitudes are in whole **Coulombs** (not micro-Coulombs).

Also Note: If you wish, you are permitted and encouraged to approximate the electrostatic constant as:

$$k_e \equiv \frac{1}{4\pi\varepsilon_0} \approx 9\times 10^9 \frac{Nm^2}{C^2}$$

a) Draw a neat and clear sketch of the situation, as you understand it. Your sketch must express a clear decision as to which directions are designated by + and – on each axis (4 pts).

b) At (0,0) there sits a +1 Coulomb point charge. Compute the magnitude and direction of Electrostatic Force acting *on it*.