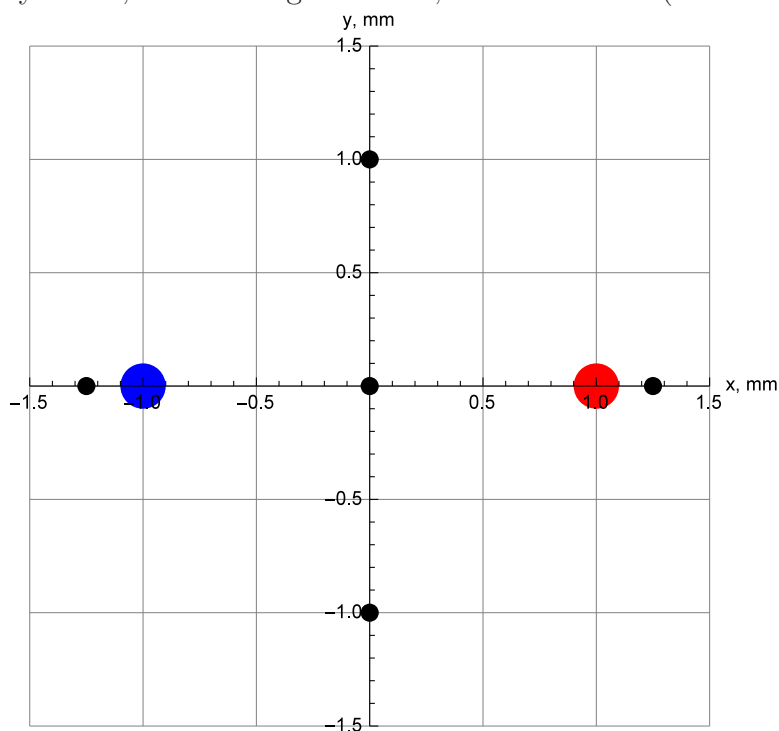


## Electric field due to point charges; superposition

1. Consider two charges with  $q_1 = -1 \text{ nC}$  (left) and  $q_2 = +1 \text{ nC}$  (right) separated by  $2 \text{ mm}$ , as in the figure below;  $1 \text{ nC} = 10^{-9} \text{ C}$  (nano-Coulomb).



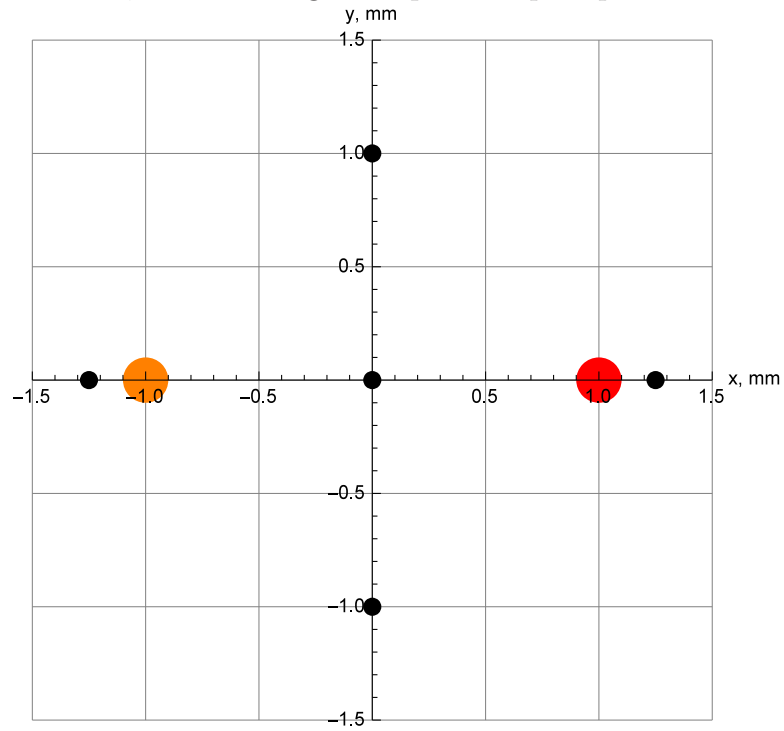
Find the direction of the field at each of the 5 points indicated in the graph and listed below, and show your work to instructor (all distances are in  $mm$ ):

- (a) (0, 0)
- (b) (1.25, 0)
- (c) (-1.25, 0)
- (d) (0, 1)
- (e) (0, -1)

Calculate the magnitude of the field at each of those points, and show your work.

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2. the same, if both charges are positive  $q_1 = q_2 = +1 \text{ nC}$ .



Show your work separately for directions and for the magnitudes:

- (a) (0, 0)
- (b) (1.25, 0)
- (c) (-1.25, 0)
- (d) (0, 1)
- (e) (0, -1)