66. (a) Since the two charges in question are of the same sign, the point $x = 2.0\,\text{mm}$ should be located in between them (so that the field vectors point in the opposite direction). Let the coordinate of the second particle be x' ($x' > 0$). Then, the magnitude of the field due to the charge $-q_1$ evaluated at x is given by $E = q_1/4\pi\varepsilon_0 x^2$, while that due to the second charge $-4q_1$ is $E' = 4q_1/4\pi\varepsilon_0(x'-x)^2$. We set the net field equal to zero:

$$\vec{E}_{\text{net}} = 0 \quad \Longrightarrow \quad E = E'$$

so that

$$\frac{q_1}{4\pi\varepsilon_0 x^2} = \frac{4q_1}{4\pi\varepsilon_0(x'-x)^2} \ .$$

Thus, we obtain $x' = 3x = 3(2.0\,\text{mm}) = 6.0\,\text{mm}$.

(b) In this case, with the second charge now positive, the electric field vectors produced by both charges are in the negative x direction, when evaluated at $x = 2.0\,\text{mm}$. Therefore, the net field points in the negative x direction.