Quiz #2: Electric Fields

Problem 1 (2 points)
A 200-N/C electric field is in the positive x direction. The force on an electron in this field is:

a) 200 N in the positive x direction
b) 200 N in the negative x direction
c) 3.2×10^{-17} N, in the positive x direction
d) 3.2×10^{-17} N, in the negative x direction
e) 0

Problem 2 (3 points)
A positive charge +Q is distributed uniformly along the positive x-axis while a negative charge –Q is distributed uniformly along the negative x-axis as shown in the figure below.

The magnitude of the electric field a distance y above the perpendicular bisector of the rod is given by

$$\vec{E} = \frac{\lambda}{2\pi\varepsilon_0}\left(\frac{1}{y} - \frac{1}{\left(y^2 + L^2\right)^{1/2}}\right)$$
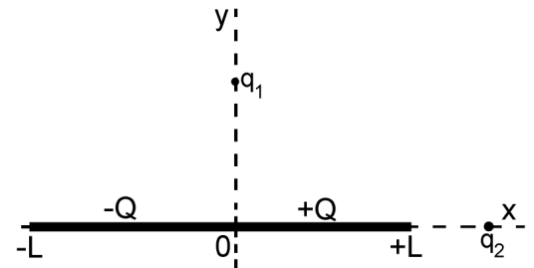
Simplify the above expression for the electric field in the limit that y is much larger than L (y >> L).

Problem 3 (5 points)
The figure below shows two charged particles on an x-axis: $q_1 = -3.20$ µC at x = -3.00 cm and $q_2 = 3.20$ µC at x = +3.00 cm. What are the magnitude and direction (relative to the +x-axis) of the net electric field produced at point P at y = 4.00 cm?