Field Intensity

① $E = \frac{F_e}{q}$

$= \frac{-3.2}{-2.4 \times 10^{-6}}$

$E = \boxed{1\ 333\ 333\ N/C \ [Right]}$

② $F_e = qE$

$= (2.5 \times 10^{-7})(12)$

$F_e = \boxed{3.0 \times 10^{-6}\ N}$

③ $E = \frac{KQ}{r^2}$

$= \frac{(9 \times 10^9)(5.4 \times 10^{-4})}{3^2}$

$E = \boxed{540\ 000\ N/C \ [Right]}$

④ $E_x = \frac{KQ}{r^2} = \frac{(9 \times 10^9)(50 \times 10^{-6})}{0.75^2} = 800\ 000\ N/C \ [Right]$

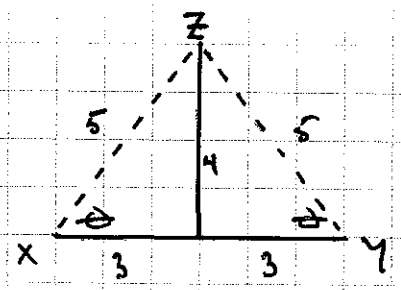
$E_y = \frac{KQ}{r^2} = \frac{(9 \times 10^9)(10 \times 10^{-6})}{0.3^2} = 1\ 000\ 000\ N/C \ [Left]$

$E = 800\ 000 - 1\ 000\ 000 = -200\ 000\ N/C$

or

$\boxed{200\ 000\ N/C \ [Left]}$

⑤



$\theta = \tan^{-1}\left(\frac{4}{3}\right) = 53.130$

$E_x = \frac{kQ}{r^2} = \frac{(9\times10^9)(2\times10^{-8})}{(0.05)^2} = 72\,000 \text{ N/C } [53^\circ \text{ N of E}]$

$E_y = \frac{kQ}{r^2} = \frac{(9\times10^9)(2\times10^{-8})}{(0.05)^2} = 72\,000 \text{ N/C } [53^\circ \text{ N of W}]$

	N	E
E_x	72000 sin 53	72000 cos 53
E_y	72000 sin 53	-72000 cos 53
E	115 200	0

$E = \boxed{115\,200 \text{ N/C } [N]}$

⑥ $\boxed{3.5\times10^3 \text{ N/C}}$ because the field between parallel plates is uniform (the same everywhere).

⑦ Removing half the charge will reduce the field by half. Changing the separation has no effect.

$\therefore E = \boxed{1.5\times10^3 \text{ N/C}}$