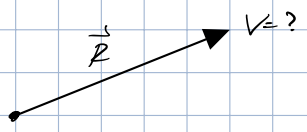
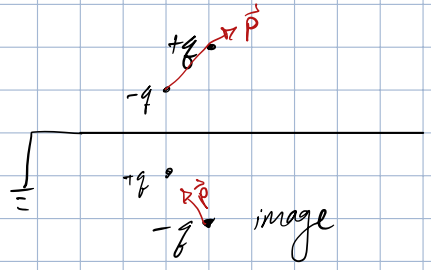
monopole: $\frac{1}{4\pi\epsilon_0}\frac{q}{R}$

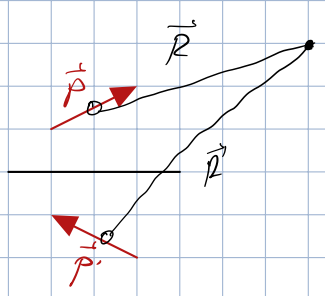


dipole:

$\frac{1}{4\pi\epsilon_0}\frac{\vec{p}\cdot\hat{R}}{R^2}$

image charge





$\frac{1}{4\pi\epsilon_0}\left(\frac{\vec{p}\cdot\hat{R}}{R^2}+\frac{\vec{p}\cdot\hat{R}'}{R'^2}\right)$

polarization: 2 charges free & bound

$$\rho_{tot} = \rho = \rho_{free} + \rho_{bound} = \rho_{free} + (-\vec{\nabla}\cdot\vec{P})$$
$$\sigma_{tot} = \sigma = \sigma_{free} + \sigma_{bound} = \sigma_{free} + (\vec{P}\cdot\hat{n})$$

$$\vec{E} = \vec{E}_{free} + \vec{E}_{bound}$$
$$V = V_{free} + V_{bound}$$

$$\vec{D} = \epsilon_0\vec{E} + \vec{P}$$

capacitors & batteries