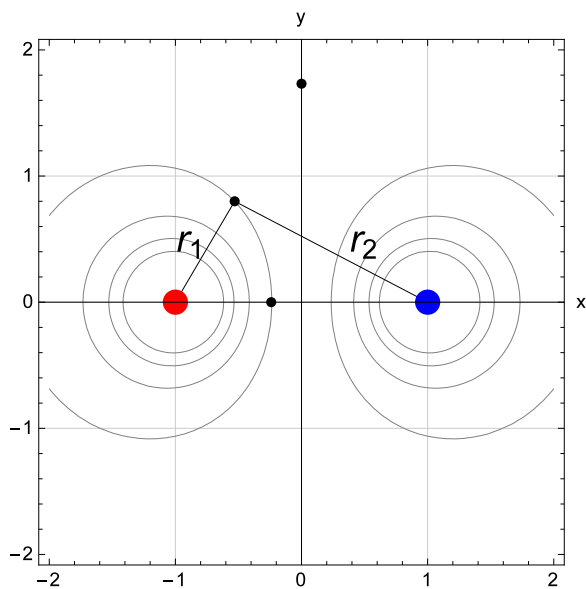


Potential and conductors

1. Dipole. Positive charge $q = 1 \text{ nC}$ on the left; distances in cm .

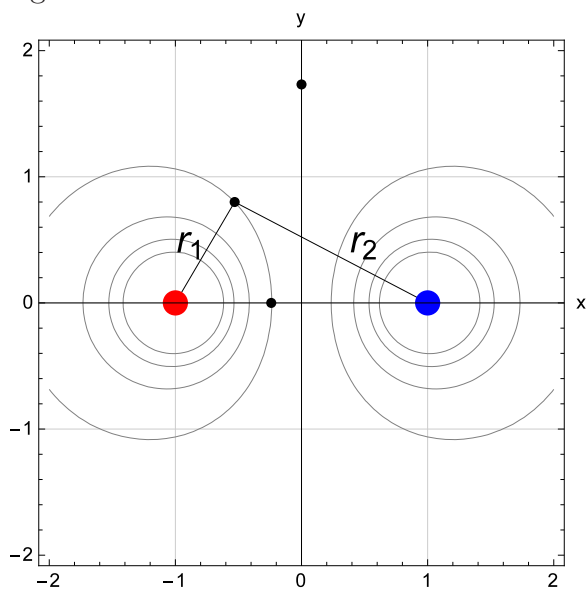
(a)

$$V = kq/r_1 - kq/r_2$$

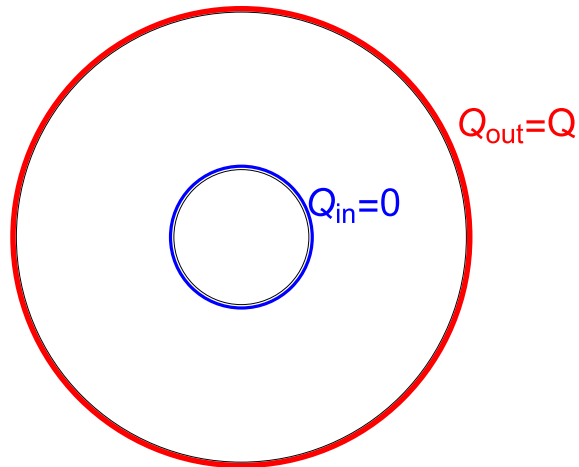


Evaluate potential at the 3 indicated points.

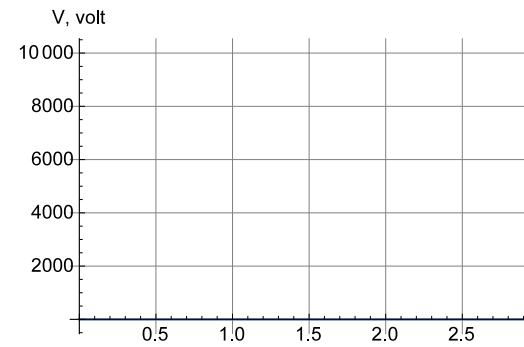
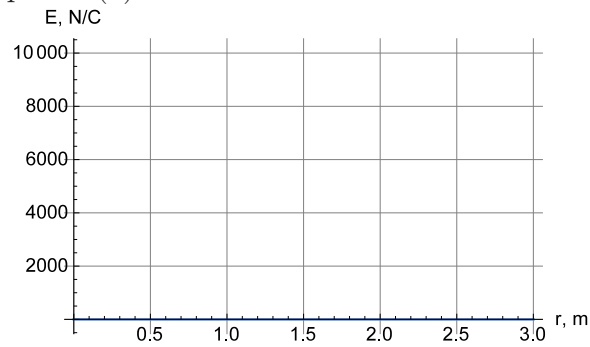
- (b) . Sketch the electric field lines (perpendicular to "lines" $V = \text{const}$), including direction.



2. Charged conducting sphere with $Q = 1\mu\text{C}$, $R = 1\text{ m}$. (Cavity does not matter for E or V)

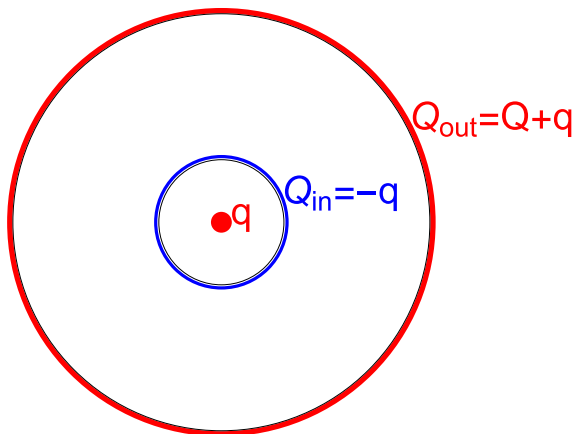


- (a) plot $E(r)$ for $0 < r < 3\text{ m}$



- (b) plot $V(r)$ for $0 < r < 3\text{ m}$; use $V(r) = kq/r$, $r \geq R$ and $V = \text{const}$, $r \leq R$

3. Conducting thick spherical shell with $R = 1\text{ m}$, $R_0 = 40\text{ cm}$ (inner radius), and with a charge $q = 2\text{ }\mu\text{C}$ inside the cavity. Q of the shell is same as before, $1\text{ }\mu\text{C}$.



- (a) find E at $r = 0.3, 0.5, 2\text{ m}$.
 (b) sketch $V(r)$

