

13. (a) The potential difference is

$$\begin{aligned} V_A - V_B &= \frac{q}{4\pi\epsilon_0 r_A} - \frac{q}{4\pi\epsilon_0 r_B} \\ &= (1.0 \times 10^{-6} \text{ C}) \left(8.99 \times 10^9 \frac{\text{N}\cdot\text{m}^2}{\text{C}^2} \right) \left(\frac{1}{2.0 \text{ m}} - \frac{1}{1.0 \text{ m}} \right) = -4500 \text{ V} . \end{aligned}$$

- (b) Since $V(r)$ depends only on the magnitude of \vec{r} , the result is unchanged.