Electric Potential of a Uniformly Charged Spherical Shell

- Electric charge on shell: \( Q = \sigma A = 4\pi \sigma R^2 \)

- Electric field at \( r > R \): \( E = \frac{kQ}{r^2} \)

- Electric field at \( r < R \): \( E = 0 \)

- Electric potential at \( r > R \):
  \[
  V = -\int_{\infty}^{r} \frac{kQ}{r^2} \, dr = \frac{kQ}{r}
  \]

- Electric potential at \( r < R \):
  \[
  V = -\int_{\infty}^{R} \frac{kQ}{r^2} \, dr - \int_{R}^{r} (0) \, dr = \frac{kQ}{R}
  \]

- Here we have used \( r_0 = \infty \) as the reference value of the radial coordinate.