Special Problem 5-4.1

1. Two parallel conducting plates are located at plane \( z = 0 \) and at plane \( z = -1 \).

2. The plate located at \( z = -1 \) has an electric potential of \( (13/12) \) V.

3. The plate located at \( z = 0 \) has an electric potential of 0 V.

4. The region between the plates is filled with charge. The density of this charge is:

\[
\rho_v (\vec{r}) = \varepsilon_0 \cdot z^2 \quad \left[ \frac{\text{Coulombs}}{m^2} \right]
\]

Find the electric potential function \( V(z) \) for the region between the plates.

Determine the electric field in the region between the plates.