Special Problem 5-2.4

A resistor with length 2 and radius 1 is aligned with the z-axis (but note that it is not centered at the origin).

This cylinder is made of material with conductivity:

\[ \sigma = \frac{1}{2\pi z} \left[ \frac{1}{\Omega \cdot m} \right] \]

The electric potential within this resistor is:

\[ V(\vec{r}) = -3z^2 \quad [Volts] \]

Determine the numeric value of the resistance of this cylinder.