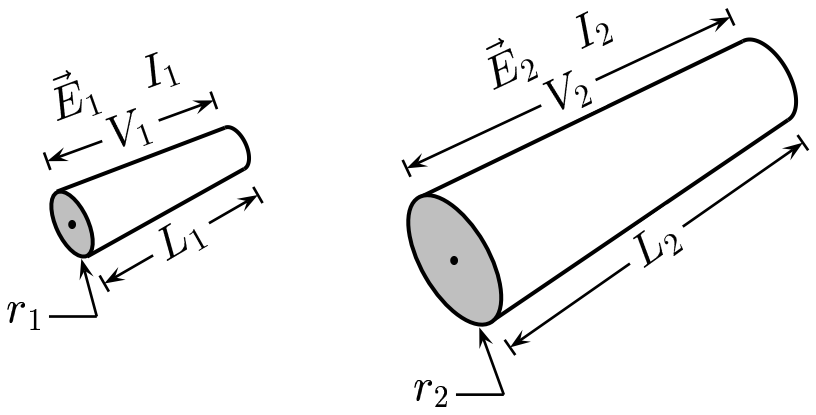
Given : $A = \pi\, r^2\,, \quad \rho_2 = \rho_1\,, \quad A_2 = 2\,A_1\,, \quad L_2 = 2\,L_1\,, \quad$ and $\quad V_2 = V_1\,.$




Find the ratio $\dfrac{I_2}{I_1}$ of the currents in the conductors.

A) $\dfrac{I_2}{I_1} = 2\,.$

B) $\dfrac{I_2}{I_1} = 1\,.$

C) $\dfrac{I_2}{I_1} = \dfrac{1}{2}\,.$

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Using Ohm's law, we have

$$\frac{I_2}{I_1} = \frac{\left(\dfrac{V_2}{R_2}\right)}{\left(\dfrac{V_1}{R_1}\right)} = \frac{R_1}{R_2}$$

$$= \frac{\rho\left(\dfrac{L_2}{A_2}\right)}{\rho\left(\dfrac{L_1}{A_1}\right)} = \frac{\left(\dfrac{L_1}{L_2}\right)}{\left(\dfrac{A_1}{A_2}\right)} = 1\,.$$

Answer **B**.