Lab 1 Discovering Ohm's Law

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Table 1: Voltage vs. Current

	1	2	3	4	5	6
Voltage (V)	1.05	2.01	3.06	3.98	4.95	5.98
Current (I)	0.012	0.023	0.036	0.046	0.058	0.069
Resistance (R)	87.50	87.39	85.00	86.52	85.34	86.67

$$R, \sigma_R = \boxed{86.40 \pm 1.0346, 0.0102} \tag{1}$$

Table 2: Resistance vs. Length

Length	2m	4m	6m	8m	10m
Voltage (V)	1.00	0.98	1.01	1.01	0.99
Current (I)	0.062	0.030	0.021	0.016	0.012
Resistance (R)	16.129	32.667	48.095	63.125	82.500
Area (A)	8.5517e-08	8.4458e-08	8.6036e-08	8.7402e-08	8.3595e-08
Diameter (D)	4.6666e-04	4.6373e-04	4.6807e-04	4.7177e-04	4.6138e-04

$$\begin{aligned} A, \sigma_A &= \boxed{8.5399e-08 \pm 1.4657e-09} \\ D, \sigma_D &= \boxed{0.00046632 \pm 3.9998e-06} \end{aligned} \tag{2}$$

1. What conclusion can you draw from your data reduction?
   - Voltage is directly proportional to the current: V $\propto$ I $\Rightarrow$ V = RI, proving Ohm's law.
2. Do the experimental points really fall on a straight line in your plots? Give some discussion.
   - For Voltage vs. Current, the points lie on the fitted line proving Ohm's law and experiment done properly.
   - For Resistance vs. Length, the points lie mostly on the fitted line. At 8m, voltage did not change from 6m. Not sure if that has to do with calibration error or not but the possibility of the line not fitting has to do with the same voltage from 6m to 8m.