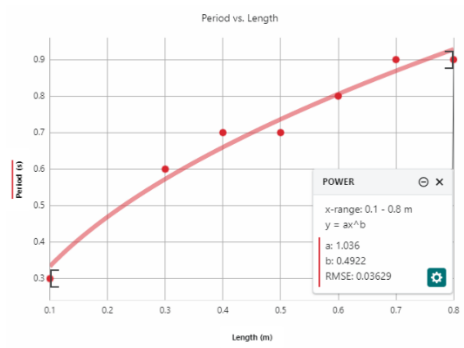
Data Table 1

Length (m)	Time for 10 Swings (s)	Period (s)
0.1	2.8	0.3
0.3	5.7	0.6
0.4	6.6	0.7
0.5	7.2	0.7
0.6	8.2	0.8
0.7	8.8	0.9
0.8	9.4	0.9

Include Graph (See question 1A)



T = S/10
T = 2.8/10 = 0.28 ≈ 0.3 s
T = 5.7/10 = 0.57 ≈ 0.6 s
T = 6.6/10 = 0.66 ≈ 0.7 s
T = 7.2/10 = 0.72 ≈ 0.7 s
T = 8.2/10 = 0.82 ≈ 0.8 s
T = 8.8/10 = 0.88 ≈ 0.9 s
T = 9.4/10 = 0.94 ≈ 0.9 s

Data Analysis

1. Use the graphing software of your choice to create a graph of the period versus the length. The shape of the graph may be different than any other you have done. Do a curve fit on the graph as a power function. The resulting graph is a half-parabola around the x-axis.
   A. Include a screenshot of your graph in the space above.
   B. Describe the equation from the graph in a complete sentence.

      The period of the pendulum is equal to the constant 1.04 multiplied by the length to the power of ½.

   C. The square root of x can be written as $x^{1/2}$. If the generic equation is $y = kx^{1/2}$, give the specific equation using the actual variables in this data, instead of the generic "y" and "x."

      $\boldsymbol{s = 1.04m^{0.5}}$

      s = period
      m = length

2. Examine your graph.
   A. What length pendulum would have a period of 1.0 s?

      $\boldsymbol{y = (1.04)x^{0.5}}$
      $\boldsymbol{x = ?}$
      $\boldsymbol{1.0 = (1.04)x^{0.5} = 0.924}$ **m**

      The length of the pendulum would be 0.92 m

B. What period would be produced by a pendulum 1.5 m long?

$$\boldsymbol{y = (1.04)x^{0.5}}$$
$$\boldsymbol{y = ?}$$
$$\boldsymbol{y = (1.04)(1.5)^{0.5} = \textbf{1.273 s}}$$

The period would be 1.3 seconds

Questions:

3. The equation for the period of a pendulum is T = 2π $\sqrt{\frac{L}{g}}$

A. How does your equation from 1C compare to the pendulum equation?

The half parabola formed by my equation in 1C is flipped by the square root in the pendulum equation, which makes it aligned around the x-axis.

B. Use the pendulum equation to calculate the period of a 1.50 m pendulum. Remember that the value of "g" is 9.8 m/s^2.

T = 2π $\sqrt{\frac{L}{g}}$

T=2π $\sqrt{\frac{1.50}{9.8}} = 2.458\ seconds$

The period would be 2.5 seconds

C. Compare your calculated period (3B) to your data (2B) by using the graph you constructed. Describe the possible sources for error that could lead to differences.

The period from my data (2B) was *1.3 seconds*, while the period from my calculations (3B) was *2.5 seconds*; therefore, they do not match. The possible sources for error here may include the calculation of gravity and the inclusion of a square root in the equation used for the calculation.

4. The following data has been gathered by another lab group. Analyze this data using your graph as the reference. Describe the experimental error you detect in the group's data?

<table>
<tr><th>Length (m)</th><th>Period (s)</th><td rowspan="6">Response:

The experimental error I detected after analyzing this group's data is that the gravity value they were working with is different than the one I was working with. If the gravity was the same, than maybe they only timed part of a period, or just flat out used a wrong equation. This all ultimately leads to the difference between results.</td></tr>
<tr><td>0.80</td><td>0.94</td></tr>
<tr><td>0.60</td><td>0.78</td></tr>
<tr><td>0.50</td><td>0.75</td></tr>
<tr><td>0.30</td><td>0.56</td></tr>
<tr><td>0.10</td><td>0.38</td></tr>
</table>