

M0 Lab Report

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VI-1

Diameters of the Bob:

Ruler	Digital Caliper
2.50 cm	2.52 cm
2.31 cm	2.49 cm
2.60 cm	2.51 cm

Range of Ruler Measurements (Maximum – Minimum) : $2.60 \text{ cm} - 2.31 \text{ cm} = 0.29 \text{ cm}$

Range of Digital Caliper Measurements (Maximum – Minimum) : $2.52 \text{ cm} - 2.49 \text{ cm} = 0.03 \text{ cm}$

The range of the digital caliper measurements is much smaller than the range of ruler measurements. I would conclude that the digital caliper is more precise than the ruler.

Thickness of 100 g Mass:

Ruler	Digital Caliper
0.85 cm	0.89 cm
0.84 cm	0.88 cm
0.79 cm	0.88 cm

Range of Ruler Measurements (Maximum – Minimum) : $0.85 \text{ cm} - 0.79 \text{ cm} = 0.06 \text{ cm}$

Range of Digital Caliper Measurements (Maximum – Minimum) : $0.89 \text{ cm} - 0.88 \text{ cm} = 0.01 \text{ cm}$

The range of the digital caliper measurements is once again smaller than the range of the rulers, further supporting my conclusion that the digital caliper measurements are more precise than the ruler measurements.

The range of ruler measurements for the diameter of the bob was 0.29 cm and for thickness of the 100g mass, the range was 0.06 cm. The range regarding the bob diameter is much larger than the range regarding the 100g mass. The bob related range is almost 5 times larger than the range for the 100g mass. This is true because it is much easier to determine the edges of the 100g mass, while a round object like the bob is far more difficult to identify exactly which points to measure between.

V1-2

Measured Values of T in Seconds

1.63	1.53	1.60
1.58	1.56	1.50
1.65	1.51	1.53
1.51	1.61	1.60
1.51	1.60	1.53

Excel returns the average value of $T = 1.563$ seconds

Excel returns the SD (standard deviation) of T as $= 0.0495$ seconds

The SD of the mean is given as $= 0.013$ seconds

Therefore $T \pm \sigma_T = 1.56 \pm 0.01$ seconds

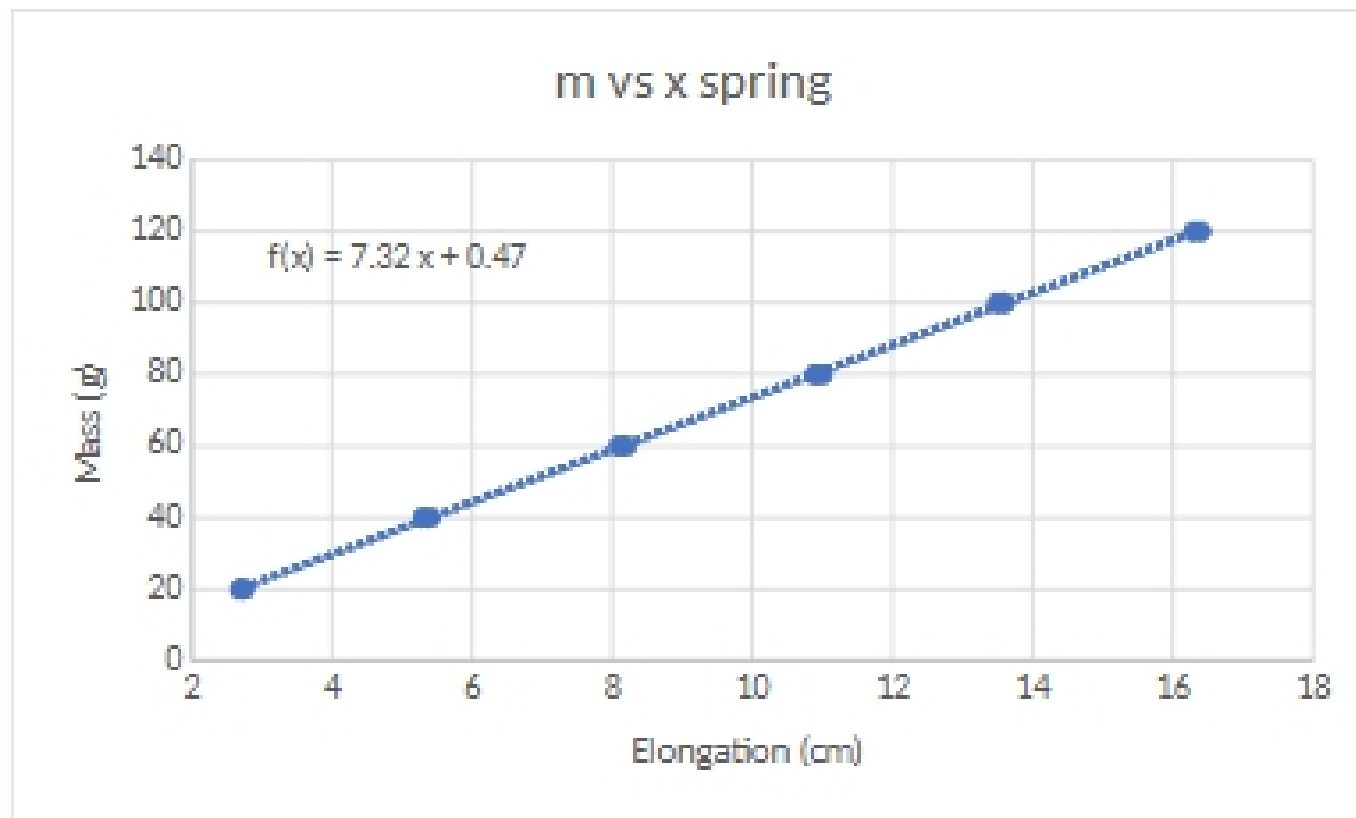
VI-3

$x_0 = 56.30$ cm

$x = x_m - x_0$

x_m (cm)	x (cm)	m (g)	
53.6	2.7	20	
53.55	2.75	20	
53.6	2.7	20	
51	5.3	40	
50.9	5.4	40	
51	5.3	40	
48.1	8.2	60	
48.2	8.1	60	
48.2	8.1	60	
45.4	10.9	80	
45.3	11	80	
45.4	10.9	80	
42.8	13.5	100	
42.8	13.5	100	
42.7	13.6	100	
40	16.3	120	
39.9	16.4	120	
39.9	16.4	120	
slope	7.31674 9	0.47055 8	intercept

slope unc	0.02704	0.28628	1	intercept unc
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$$s \pm \sigma_s = 7.32 \pm 0.03 \text{ g/cm}$$

$$b \pm \sigma_b = 0.47 \pm 0.3 \text{ g}$$

Since

The slope

Therefore,

$$k = (980 \text{ cm/s}^2)(7.3167 \text{ g/cm}) = 7170.4 \text{ g/s}^2$$

$$k = C, g = A, s = B$$

Since $\sigma_g = 0$,