Dealing with Measurements

* Consider a measurement in THREE parts: number // exponent // units

a. Know the rules of addition, subtraction, multiplication and division

1. Addition and/or subtraction: must have common exponent

2. Multiplication: multiply numbers & add superscripts

3. Division: divide numbers & subtract superscripts

b. Always deal numbers with numbers, exponents with exponents, and units with units

c. Choose which aspect is your highest priority

* + Some work with exponents first, others work to have common units first
  + I usually work with the numbers and exponents first, then deal with the units

d. Use the “thumbs up, thumbs down” rule when factor labeling either scientific notation or units

1. Converting to or from Scientific Notation

a. If the number increases, decrease the exponent [*use multiples of 10*]

0.560 🡪 5.6 x 10**-1**

b. If the number decreases, increase the exponent [*use multiples of 10*]

560 🡪 5.6 x 10**2**

2. Converting units into equalities for factor labeling

a. The larger unit will have the smaller number (usually 1)

Km & m Km > m … **1** Km 🡪 ?? m

b. Determine how many factors/multiples of TEN the units are apart, and that is the superscript

Km 🡪 Hm 🡪 Dm 🡪 m … 1 Km 🡪 10**3** m

Graphing

Label the graph and plot the data points from the table below. Describe the resulting curve. What general equation could be used to describe the slope?

|  |  |
| --- | --- |
| **Mass (kg)** | **Acceleration (m/s2)** |
| 1.0 | 12.0 |
| 2.0 | 5.9 |
| 3.0 | 4.1 |
| 4.0 | 3.0 |
| 5.0 | 2.5 |
| 6.0 | 2.0 |

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Label the graph and plot the data points from the table below. Describe the resulting curve. What general equation could be used to describe the slope?

|  |  |
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| **Distance (mm)** | **Height (mm)** |
| 0 | 0.0 |
| 100 | 12.5 |
| 200 | 50.0 |
| 300 | 112.5 |
| 400 | 200.0 |
| 500 | 312.5 |
| 600 | 450.0 |

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Mass vs Acceleration

0.0

3.0

6.0

0.0

6.0

12.0

Acceleration (m/s2)

Mass (g)

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The slope is hyperbolic (inverse relationship between acceleration and mass). y = kx + C.

Distance vs Height

300

0

600

Height (mm)

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|  |  |  | Distance (mm) |  |  |  |  |

600

300

0.0

The slope is parabolic (direct relationship between distance and height). y = kx2 + C.