

# Data Analysis

## Jupiter's Moons Lab

$$\frac{R^3}{T^2} = \frac{GM}{4\pi^2} \rightarrow \boxed{\text{linearize}} \rightarrow y = mx \rightarrow R^3 = \frac{GM}{4\pi^2} T^2$$

$$Y = (3 \times 10^{15})x + (3 \times 10^{25})$$

$$m = 3 \times 10^{15}$$

$$\frac{GM}{4\pi^2} = 3 \times 10^{15}$$

$$M = \frac{4\pi^2 (3 \times 10^{15})}{G}$$

$$\text{exp } M = 1.7748 \times 10^{27} \text{ kg}$$

$$\text{real } M = 1.8981 \times 10^{27} \text{ kg}$$

$\boxed{\text{percent error}}$

$$\frac{\text{exp} - \text{theor}}{\text{exp}} \times 100 = \frac{1.7748 \times 10^{27} - 1.8981 \times 10^{27}}{1.7748 \times 10^{27}} \times 100 = 6.97\%$$