Estimate to 1 or 2 significant digits or nearest order of magnitude the size of everyday objects.

- estimate familiar lengths, masses, weights + times
- estimate based on a scale diagram
- rough estimates for calculation
- trace any error between the estimated + calculated

Examples

- dimensions of your physics book in cm (1 sf) 3×10^{1} cm 2×10^{1} cm 3 cm
- mass of an apple in kg (1 sf) 5×10^{-1} kg
- period of a heart beat in s (to 1 sf) 1 s
- quantity of milk you drink in a year in cm^3 (to 1 sf) 5×10^{5} cm^3

Estimate the following to the nearest order of magnitude

$10^5 \times 10^4 \times 10^{-4} \div 10^6$

① $47816 \times (4293 \times 10^{-4}) / 403000$

4293 E-4

10^{-1} (0.050936...)

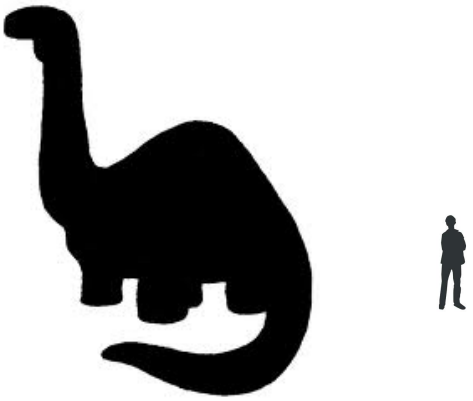
10^{-2} and 10^{-1}

② $\sqrt{\dfrac{2\pi \; 10^1}{4.6 \times 10^{-5}}}$ 10^{-4}

$\sqrt{\frac{10^1}{10^{-4}}} = \sqrt{10^5}$

$= 10^{5/2}$ 10^2 or 10^3

316 ↑ middle



Estimate the mass of the dinosaur in kg to the nearest order of magnitude. State any assumptions that you have made.

10^5 kg LCA NM MMM

10^4 kg Eng Cary Mina

10^3 kg JSJ

10^2 Kg HJA

10^4 kg LR

10^4 Kg KT

~~10^1~~

~~10^2~~

10^3

10^4

10^5 (100000kg)

~~10^6~~

~~10^{10}~~

1.2 Measurement & Uncertainty

1 THE SEVEN BASE UNITS IN THE INTERNATIONAL SYSTEM OF UNITS (SI)

Quantity	Name of base SI Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

all of these except the kg can be measured in the lab.