

Useful Physics Info

Conversion Factors

Length

1 in = 2.54 cm
 1 ft = 0.3048 m
 1 mi = 5280 ft = 1.609 km = 1609 m
 1 m = 3.281 ft
 1 km = 0.6214 mi
 1000 m = 0.6214 mi

Mass

1 slug = 14.59 kg
 1 kg = 1000 grams = 6.82×10^{-2} slug

Time

1 day = 24 h = 1.44×10^3 min = 8.64×10^4 s
 1 yr = 365.24 days = 3.156×10^7 s

Volume

1 liter = 10^{-3} m³ = 1000 cm³ = 0.03531 ft³
 1 U.S. gallon = 3.785×10^{-3} m³ = 0.1337 ft³

Metric Prefixes Used To Denote Multiples Of Ten

Prefix	Symbol	Factor
Tera	T	10^{12}
Giga	G	10^9
Mega	M	10^6
Kilo	k	10^3
Hecto	h	10^2
Deka	da	10^1
Deci	d	10^{-1}
Centi	c	10^{-2}
Milli	m	10^{-3}
Micro	μ	10^{-6}
Nano	n	10^{-9}
Pico	p	10^{-12}
Femto	f	10^{-15}

Work and Energy

1 J = 0.7376 ft lb = 10^7 ergs
 1 kWh = 3.600×10^6 J
 1 eV = 1.602×10^{-19} J

Force

1 lb = 4.448 N
 1 N = 10^5 dynes = 0.2248 lb

Angle

1 radian = 57.30°

Basic Mathematical Formulas

Area of a circle = πr^2

Circumference of a circle = $2\pi r$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Pythagorean theorem: $a^2 + b^2 = c^2$

$\sin \theta = o/h$

$\cos \theta = a/h$

$\tan \theta = o/a$

Quadratic Formula:

If $ax^2 + bx + c = 0$, then,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Logarithms: If $Y = \log_{10} X$, then,

$$10^Y = X$$

$$\%Error = \left| \frac{\text{Theoretical} - \text{Experimental}}{\text{Theoretical}} \right| \times 100$$

Fundamental Constants

Quantity	Symbol	Value
Electron charge magnitude	e	$1.60217733 \times 10^{-19} \text{ C}$
Permittivity of free space	ϵ_0	$8.854187817 \times 10^{-12} \text{ C}^2/(\text{Nm}^2)$
Planck's constant	h	$6.62606891 \times 10^{-34} \text{ Js}$
Mass of electron	m_e	$9.1093897 \times 10^{-31} \text{ kg}$
Mass of neutron	m_n	$1.6749286 \times 10^{-27} \text{ kg}$
Mass of proton	m_p	$1.6726231 \times 10^{-27} \text{ kg}$
Speed of light in vacuum	c	$2.99792458 \times 10^8 \text{ m/s}$
Universal gravitational constant	G	$6.67259 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$

Useful Physical Data

Acceleration due to earth's gravity (g)	$9.80 \text{ m/s}^2 = 32.2 \text{ ft/s}^2$
Speed of sound in air (20° C)	343 m/s
Water	
Density (4° C)	$1.000 \times 10^3 \text{ kg/m}^3$
Specific heat capacity	4186 J/(kg C°)
Earth	
Mass	$5.98 \times 10^{24} \text{ kg}$
Radius (equatorial)	$6.38 \times 10^6 \text{ m}$
Mean distance from sun	$1.50 \times 10^{11} \text{ m}$
Moon	
Mass	$7.35 \times 10^{22} \text{ kg}$
Radius (mean)	$1.74 \times 10^6 \text{ m}$
Mean distance from earth	$3.85 \times 10^8 \text{ m}$
Sun	
Mass	$1.99 \times 10^{30} \text{ kg}$
Radius (mean)	$6.96 \times 10^8 \text{ m}$