

# Back-of-the-envelope numbers

<i>Symbol</i>	<i>What</i>	<i>Value</i>	<i>Units</i>
$\pi$	pi	3	
$G$	Newton's constant	$7 \cdot 10^{-11}$	$\text{kg}^{-1} \text{m}^3 \text{s}^{-1}$
$c$	speed of light	$3 \cdot 10^8$	$\text{m s}^{-1}$
$k_B$	Boltzmann's constant	$10^{-4}$	$\text{eV K}^{-1}$
$e$	electron charge	$1.6 \cdot 10^{-19}$	C
$\sigma$	Stefan-Boltzmann constant	$6 \cdot 10^{-8}$	$\text{W m}^{-2} \text{K}^{-4}$
$m_{\text{sun}}$	Solar mass	$2 \cdot 10^{30}$	kg
$R_{\text{earth}}$	Earth radius	$6 \cdot 10^6$	m
$\theta_{\text{moon/sun}}$	angular diameter	$10^{-2}$	
$\rho_{\text{air}}$	air density	1	$\text{kg m}^{-3}$
$\rho_{\text{rock}}$	rock density	5	$\text{g cm}^{-3}$
$\hbar c$		200	$\text{eV nm}$
$L_{\text{vap}}^{\text{water}}$	heat of vaporization	2	$\text{MJ kg}^{-1}$
$\gamma_{\text{water}}$	surface tension of water	$10^{-1}$	$\text{N m}^{-1}$
$a_0$	Bohr radius	0.5	$\text{\AA}$
$a$	typical interatomic spacing	3	$\text{\AA}$
$N_A$	Avogadro's number	$6 \cdot 10^{23}$	
$\mathcal{E}_{\text{fat}}$	combustion energy density	9	$\text{kcal g}^{-1}$
$E_{\text{bond}}$	typical bond energy	4	eV
$\frac{e^2/4\pi\epsilon_0}{\hbar c}$	fine-structure constant $\alpha$	$10^{-2}$	
$p_0$	air pressure	$10^5$	Pa
$\nu_{\text{air}}$	kinematic viscosity of air	$1.5 \cdot 10^{-5}$	$\text{m}^2 \text{s}^{-1}$
$\nu_{\text{water}}$	kinematic viscosity of water	$10^{-6}$	$\text{m}^2 \text{s}^{-1}$
day		$10^5$	s
year		$\pi \cdot 10^7$	s
$F$	solar constant	1.3	$\text{kW m}^{-2}$
AU	distance to sun	$1.5 \cdot 10^{11}$	m
$P_{\text{basal}}$	human basal metabolic rate	100	W
$K_{\text{air}}$	thermal conductivity of air	$2 \cdot 10^{-2}$	$\text{W m}^{-1} \text{K}^{-1}$
$K$	... of non-metallic solids/liquids	1	$\text{W m}^{-1} \text{K}^{-1}$
$K_{\text{metal}}$	... of metals	$10^2$	$\text{W m}^{-1} \text{K}^{-1}$
$c_p^{\text{air}}$	specific heat of air	1	$\text{J g}^{-1} \text{K}^{-1}$
$c_p$	... of solids/liquids	25	$\text{J mole}^{-1} \text{K}^{-1}$