Fermi

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Contents

1 Prelude

Hmmmmm.

2 Logarithms and Exponents

Logarithms	Value		Powers	Value
$\log_{10} 2$	0.30		$10^{0.1}$	1.26
$\log_{10} 3$	0.48		$10^{0.2}$	1.58
$\log_{10} 4$	0.60		$10^{0.3}$	2.00
$\log_{10} 5$	0.70		$10^{0.4}$	2.51
$\log_{10} 6$	0.78		$10^{0.5}$	3.14
$\log_{10} 7$	0.85		$10^{0.6}$	3.98
$\log_{10} 8$	0.90		$10^{0.7}$	5.01
$\log_{10} 9$	0.95		$10^{0.8}$	6.31
			$10^{0.9}$	7.94

3 Physics Olympics

Constant	Value	Details
Planck's constant	$h = 6.63 \times 10^{-34}\,\mathrm{J\,s}$	$E = h v$
Mass of electron	$m_e = 9.11 \times 10^{-31}\,\mathrm{kg}$	
Mass of proton	$m_p = 1.67 \times 10^{-27}\,\mathrm{kg}$	
Elementary charge	$e = 1.60 \times 10^{-19}\,\mathrm{C}$	
Radius of earth	$r_{earth} = 6.38 \times 10^{6}\,\mathrm{m}$	
Mass of earth	$m_{earth} = 5.98 \times 10^{24}\,\mathrm{kg}$	
Radius of sun	$r_{sun} = \mathrm{m}$	
Mass of sun	$m_{sun} = 1.98 \times 10^{30}\,\mathrm{kg}$	
Radius of moon	$r_{moon} = 1.74 \times 10^{6}\,\mathrm{m}$	
Mass of moon	$m_{moon} = 7.35 \times 10^{22}\,\mathrm{kg}$	
Astronomical Unit	$AU = 1.50 \times 10^{11}\,\mathrm{m}$	
Distance from earth to moon	$d_{earthtomoon} = 3.84 \times 10^{6}\,\mathrm{m}$	
Seconds in a day	$s_{day} = 8.64 \times 10^{4}\,\mathrm{s}$	
Seconds in a month	$s_{month} = 2.62 \times 10^{6}\,\mathrm{s}$	
Seconds in a year	$s_{year} = 3.16 \times 10^{7}\,\mathrm{s}$	

4 Lengths

Object	Size	Order of Magnitude
Proton, Neutron	1 femtometer	10^{-15}
Uranium neucleus		$10^{-14.5}$
Gamma ray		10^{-12}
Hydrogen, Helium atom		10^{-11}
X-ray, Glucose, Alpha helix		$10^{-9.2}$
Carbon nanotube, Buckyball		10^{-9}
DNA		$10^{-8.3}$
Transistor gate		$10^{-7.6}$
Virus		$10^{-7.5}$ to $10^{-6.5}$
Ultraviolet		$10^{-7.3}$
Smallest visible thing to an optical microscope		$10^{-6.8}$
Violet light		$10^{-6.4}$
Red light		$10^{-6.0}$
Bacteria		$10^{-5.9}$
Red blood cell, White blood cell, Cell nucleus	$10^{-5.3}$	
Mist droplet		$10^{-5.0}$
Infared		$10^{-4.6}$
Smallest visible thing to the human eye		$10^{-4.1}$
Paper		$10^{-3.9}$

Amoeba	$10^{-3.6}$
LCD pixel	$10^{-3.5}$
Grain of salt	$10^{-3.3}$
Grain of rice	$10^{-2.5}$
Microwave length, Penny, Marble	$10^{-1.8}$
Oak tree, Average US house	$10^{1.0}$
Blue whale	$10^{1.2}$
Boeing 747, Redwood tree, Statue of liberty	$10^{1.5}$
Football field, International space station, Saturn V	$10^{2.0}$
Titanic	$10^{2.1}$
Great pyramid of Giza	$10^{2.2}$
Eiffel tower	$10^{2.3}$
Hoover dam	$10^{2.4}$
Vatican city	$10^{2.9}$
AM radio wave	$10^{3.3}$
Central park	$10^{3.4}$
Mount everest, Large hadron collider	$10^{3.8}$
Haley's comet	$10^{3.9}$
Depth of the mariana trench	$10^{4.1}$
Marathon, Neutron star	$10^{4.3}$
Grand canyon	$10^{5.3}$
California, Italy	$10^{5.6}$
Pluto	$10^{6.1}$
Moon, USA	$10^{6.5}$
Mercury, Asia	$10^{6.6}$
Mars	$10^{6.7}$
Earth, Venus	$10^{6.9}$
Minecraft world	$10^{6.5}$
Neptune, Uranus	$10^{7.7}$
Saturn	$10^{7.9}$
Distance from earth to moon	$10^{8.3}$
The sun	$10^{8.8}$
Distance from earth to sun	10^{11}
Distance from sun to neptune	$10^{12.5}$
Light-day	$10^{13.2}$
Light-year	$10^{15.6}$
Milky way, Andromeda	$10^{20.9}$
Observable universe	$10^{26.7}$

5 Forces

Force of	Value
Weight of human	620 N
(WARN) Jump	2000 N
Gravitational attraction between proton and electron in hydrogen atom	3.6×10^{-47} N
Weight of an electron	8.9×10^{-30} N
Weight of an E. coli bacterium	1×10^{-14} N
Force to break hydrogen bond	4×10^{-12} N
Force to break typical noncovalent bond	1.60×10^{-10} N
Force to break typical covalent bond	1.6×10^{-9} N
Force on an electron in a hydrogen atom	8.2×10^{-8} N
Force between two 1 metre long conductors 1 metre apart	2×10^{-7} N
Thrust of NSTAR ion engine on NASA's space probe Deep Space 1	1.9×10^{-2} N to 9.2×10^{-2} N
Weight of an apple	1 N
Force of human bite at molars	720 N
Bite force of adult american alligator	9×10^{3} N
Bite force of adult great white shark	1.8×10^{4} N
Engine of a small car during peak acceleration	4.5×10^{4} N
Average force from seatbelt and airbag to a passenger in a car which hits a stationary barrier at $100 \, \mathrm{km \, h^{-1}}$	1×10^{5} N
Maximum pulling force of a single large diesel-electric locomotive	8.9×10^{3} N
Thrust of Space SHuttle Main Engine at lift off	1.8×10^{6} N
Weight of largest blue whale	1.9×10^{6} N
Thurst of Saturn V rocket at lift off	3.5×10^{7} N
Simple estimate of force of sunlight on earth	5.7×10^{8} N
Gravitational attraction between earth and moon	2×10^{20} N
Gravitational attraction between earth and sun	3.5×10^{22} N
Planck force	1.2×10^{44} N

6 Mass

Object	Value
Human	65 kg
Car	1500 kg
(WARN) Cruise ship	30×10^{6} kg to 220×10^{6} kg
Empire state building	330×10^{6} kg
Ounce	23.85 g
iPod touch	0.086 kg
iPod nano	0.031 kg
iPod shuffle	0.0125 kg
iPod classic	0.140 kg
iPhone 5s	0.112 kg
iPad Air	0.475 kg
iPad 2	0.600 kg
iPad mini	0.330 kg
Macbook air	1.35 kg
Macbook pro (15 inch)	2.02 kg
Mac mini	1.22 kg
Mac (21.5 inch)	5.68 kg
Mac (27 inch)	9.54 kg
(WARN) Mac pro	5 kg

7   Time

Event	Value
Time to travel one Planck length at the speed of light	5.4×10^{-44} s
Accuracy of tools to measure speed of chemical bonding	5×10^{-19} s
Shortest measured period of time	1.2×10^{-17} s
1 machine cycle by an IBM Silicon-Germanium transistor	4×10^{-12} s
1 cycle of 1 GHz microprocessor	1×10^{-9} s
Light travels 0.3 m	1×10^{-9} s
1 cycle of an Intel 80186 microprocessor	1×10^{-6} s
1 machine cycle of a 1960s minicomputer	4×10^{-6} s to 16×10^{-6} s
Human brain neuron fires one impulse and returns to rest	1×10^{-3} s
Seek time for computer hard disk	4×10^{-3} s to 8×10^{-3} s
Human response to visual	0.018 s to 0.3 s
Blink	0.1 s to 0.4 s
1 day	8.64×10^4 s
1 week	6.048×10^5 s
1 month	2.6×10^6 s
1 year	3.16×10^7 s
Human life expectancy	2.1×10^9 s (66.5 year)
1 century	3.16×10^9 s
1 millenium	3.16×10^{10} s
Time since appearance of Homo sapiens	6×10^{12} s (1.92×10^5 year)
Galactic year	7.1×10^{15} s to 7.9×10^{15} s (2.25×10^8 year to 2.5×10^8 year)
Age of earth	1.43×10^{17} s (4.54×10^9 year)
Age of solar system and sun	1.44×10^{17} s (4.6×10^9 year)
Age of the universe	4.3×10^{17} s (1.38×10^{10} year)
Estimated lifespan of 0.1 solar mass red dwarf	3.12×10^{20} s (9.89×10^{12} year)
Time for 1 solar mass black hole to evaporate completely due to Hawking radiation	6.62×10^{50} s (2.1×10^{43} year)

8   Temperature

Hmmmmm

9 Acceleration

Event	Value
0 to $100 \, \mathrm{km \, h^{-1}}$ in $6.4 \, \mathrm{s}$	$4.3 \, \mathrm{m \, s^{-2}}$
Saturn V moon rocket after launch	$11.2 \, \mathrm{m \, s^{-2}}$
0 to $100 \, \mathrm{km \, h^{-1}}$ in $2.4 \, \mathrm{s}$	$15.2 \, \mathrm{m \, s^{-2}}$
Space Shuttle max during launch/reentry	$29 \, \mathrm{m \, s^{-2}}$
Max endurable for over $25 \, \mathrm{s}$ for human	$29 \, \mathrm{m \, s^{-2}}$
High-G rollercoasters	$34 \, \mathrm{m \, s^{-2}}$ to $62 \, \mathrm{m \, s^{-2}}$
Dizziness, disorientation, fainting for humans	$49 \, \mathrm{m \, s^{-2}}$
Formula One car under heavy breaking	$49 \, \mathrm{m \, s^{-2}}$
Luge at Whistler Sliding Centre	$51 \, \mathrm{m \, s^{-2}}$
Formula One car peak lateral turn	$49 \, \mathrm{m \, s^{-2}}$ to $59 \, \mathrm{m \, s^{-2}}$
Apollo 16 on reentry	$70.6 \, \mathrm{m \, s^{-2}}$
F16 aircraft pulling out of dive	$79 \, \mathrm{m \, s^{-2}}$
Maximum with G-suit to keep consciousness	$88 \, \mathrm{m \, s^{-2}}$
Typical max turn in aerobatic or fighter jet	$88 \, \mathrm{m \, s^{-2}}$ to $118 \, \mathrm{m \, s^{-2}}$
Parachutist opening parachute	$324 \, \mathrm{m \, s^{-2}}$
Max acceleration survived on rocket sled	$454 \, \mathrm{m \, s^{-2}}$
Sprint missile	$982 \, \mathrm{m \, s^{-2}}$
$100 \, \mathrm{km \, h^{-1}}$ automobile crash into wall	$982 \, \mathrm{m \, s^{-2}}$
Soccer ball kicked	$2946 \, \mathrm{m \, s^{-2}}$
Baseball struck	$29\,460 \, \mathrm{m \, s^{-2}}$
Formula One engine piston	$84\,450 \, \mathrm{m \, s^{-2}}$
Gravity on white dwarf Sirius B	$3.8 \times 10^6 \, \mathrm{m \, s^{-2}}$
Acceleration of proton in Large Hadron Collider	$1.9 \times 10^9 \, \mathrm{m \, s^{-2}}$
Gravity on neutron star	$7 \times 10^{12} \, \mathrm{m \, s^{-2}}$
Protons in Fermilab accelerator	$8.8 \times 10^{13} \, \mathrm{m \, s^{-2}}$
Acceleration in Wakefield plasma accelerator	$8.7 \times 10^{21} \, \mathrm{m \, s^{-2}}$

10 Speed

Event	Value
Expansion between two points in free space 1 m apart	2.2×10^{-18} m s^{-1}
Rate of global sea level rise	9.8×10^{-11} m s^{-1} (3.1 mm year^{-1})
Relative speed of continental drift	3×10^{-10} m s^{-1} to 3×10^{-9} m s^{-1}
Moon receding from earth	1.3×10^{-9} m s^{-1} (38 mm year^{-1})
Human hair growth	4.8×10^{-9} m s^{-1}
Growth rate of bamboo	1.4×10^{-5} m s^{-1}
Speed of Jakobshavn Isbrae, one of the fastest glaciers	4×10^{-4} m s^{-1}
Average walking speed	1 m s^{-1} to 1.5 m s^{-1}
World record 50 m freestyle swim	2.39 m s^{-1}
World record marathon	5.72 m s^{-1}
Comfortable biking	6 m s^{-1} to 7 m s^{-1}
Usain Bolt at 100 m world record in Berlin	10.438 m s^{-1}
Usain Bolt top speed at Berlin	12.42 m s^{-1}
Residential speed limit	8 m s^{-1} to 14 m s^{-1}
Top speed of cat or dog	8 m s^{-1} to 14 m s^{-1}
Road-race cyclist	14 m s^{-1}
Racehorse or racing greyhound	17 m s^{-1}
Car (freeway), cheetah (fastest terrestrial), sailfish (fastest fish), go-fast boat	30 m s^{-1}
Land speed record for human powered vehicle	36 m s^{-1}
Top speed of local service train	40 m s^{-1}
Formula Rossa (fastest rollercoaster)	67 m s^{-1}
Modern high-speed train, diving peregrine falcon (fastest bird)	90 m s^{-1} (320 km h^{-1}, 200 mph)
Fastest record ball (golf) in sports	91 m s^{-1}
Speed of VA-111 Shkval (super tornado)	103 m s^{-1}
Max speed of Fromula One car	103.5 m s^{-1}
Max speed of Ferrari F50 GT1	105.5 m s^{-1}
Max speed of Bugatti Veyron Super Sport	119.742 m s^{-1}
Wind speed of powerful tornado	130 m s^{-1}
Top speed for experimental TGV train in 2007	157 m s^{-1}
Top speed of JR-Maglev in 2003	151 m s^{-1}
Cruising speed of modern jet airliner (e.g. Airbus A380)	250 m s^{-1}
Top seed of WWII aircraft (Me 1633B V18)	314 m s^{-1}
Speed of .22 LR bullet	320 m s^{-1}
Speed of sound in standard atmosphere (15 °C and 1)	340.3 m s^{-1}

11 Energy

11.1 General Facts

- $1 \text{ kW h} = 3.6 \times 10^6$ J

- 1 W year = 8.74 kW h

- Average cost: 14 cents per kilowatt-hour

- Average home usage per year: 11 280 kW h

- Average home usage per month: 950 kW h

- Average home usage per day: 31 kW h

11.2 Electronics

- iPhone battery: 1570 mA h at 3.7 V (5.92 W h)

- iPhone power consumption (idle – 250 hours): 23.7 mW

- iPhone power consumption (talk/internet/video – 10 hours): $592\,\mathrm{mW}$

- iPhone power consumption (audio – 40 hours): $148\,\mathrm{mW}$

- iPad battery: $8827\,\mathrm{mA\,h}$ ($118\,\mathrm{kJ}$) at $3.7\,\mathrm{V}$ ($32.9\,\mathrm{W\,h}$)

- iPad conversion example: $32.9\,\mathrm{W\,h} \approx 8827\,\mathrm{mA\,h} * 3.7\,\mathrm{V} * (1\,\mathrm{A}/1000\,\mathrm{mA})$

- iPad conversion example: $118\,\mathrm{kJ} \approx 32.9\,\mathrm{W\,h} * (3600\,\mathrm{s}/1\,\mathrm{h}) * (1\,\mathrm{kJ}/1000\,\mathrm{J})$

- (WARN) Voltage in a mobile phone circuit: $0.5\,\mathrm{V}$ to $1\,\mathrm{V}$

- (WARN) Current in a mobile phone circuit: $100\,\mathrm{mA}$ to $180\,\mathrm{mA}$

Appliance	Power Consumption
Light bulb	$2\,\mathrm{W}$ to $120\,\mathrm{W}$
Desktop	$250\,\mathrm{W}$ to $720\,\mathrm{W}$
Laptop	$250\,\mathrm{W}$
(WARN) Coffee maker	$800\,\mathrm{W}$
(WARN) Microwave	$600\,\mathrm{W}$ to $1500\,\mathrm{W}$
(WARN) Dishwasher	$1200\,\mathrm{W}$ to $1500\,\mathrm{W}$
(WARN) Washing machine	$300\,\mathrm{W}$ to $500\,\mathrm{W}$
(WARN) Iron	$1000\,\mathrm{W}$
(WARN) Air conditioner	$2000\,\mathrm{W}$ to $5000\,\mathrm{W}$
(WARN) Ceiling fan	$10\,\mathrm{W}$ to $50\,\mathrm{W}$
(WARN) TV	$150\,\mathrm{W}$
(WARN) Oven	$3000\,\mathrm{W}$

12 Electromagnetic Spectrum

Type	Wavelength	Frequency	Energy	Reference
Radio	$1 \times 10^{3}\,\mathrm{m}$	$1 \times 10^{4}\,\mathrm{Hz}$		
Microwave	$1 \times 10^{-2}\,\mathrm{m}$	$1 \times 10^{10}\,\mathrm{Hz}$		
Infared	$1 \times 10^{-5}\,\mathrm{m}$	$1 \times 10^{13}\,\mathrm{Hz}$		
Visible	$5 \times 10^{-7}\,\mathrm{m}$	$1 \times 10^{15}\,\mathrm{Hz}$		
Ultraviolet	$1 \times 10^{-8}\,\mathrm{m}$	$1 \times 10^{16}\,\mathrm{Hz}$		
X-ray	$1 \times 10^{-10}\,\mathrm{m}$	$1 \times 10^{18}\,\mathrm{Hz}$		
Gamma	$1 \times 10^{-12}\,\mathrm{m}$	$1 \times 10^{20}\,\mathrm{Hz}$		

Colour	Wavelength		Frequency		Energy	Reference
Violet	$380 \times 10^{-9}\,\mathrm{m}$ $450 \times 10^{-9}\,\mathrm{m}$	to	$668 \times 10^{12}\,\mathrm{Hz}$ $789 \times 10^{12}\,\mathrm{Hz}$	to		
Blue	$450 \times 10^{-9}\,\mathrm{m}$ $495 \times 10^{-9}\,\mathrm{m}$	to	$606 \times 10^{12}\,\mathrm{Hz}$ $668 \times 10^{12}\,\mathrm{Hz}$	to		
Green	$495 \times 10^{-9}\,\mathrm{m}$ $570 \times 10^{-9}\,\mathrm{m}$	to	$526 \times 10^{12}\,\mathrm{Hz}$ $606 \times 10^{12}\,\mathrm{Hz}$	to		
Yellow	$570 \times 10^{-9}\,\mathrm{m}$ $590 \times 10^{-9}\,\mathrm{m}$	to	$508 \times 10^{12}\,\mathrm{Hz}$ $526 \times 10^{12}\,\mathrm{Hz}$	to		
Orange	$590 \times 10^{-9}\,\mathrm{m}$ $620 \times 10^{-9}\,\mathrm{m}$	to	$484 \times 10^{12}\,\mathrm{Hz}$ $508 \times 10^{12}\,\mathrm{Hz}$	to		
Red	$620 \times 10^{-9}\,\mathrm{m}$ $750 \times 10^{-9}\,\mathrm{m}$	to	$400 \times 10^{12}\,\mathrm{Hz}$ $484 \times 10^{12}\,\mathrm{Hz}$	to		

12.1 Other Facts

- Wifi: $2.4\,\mathrm{GHz}$ to $5\,\mathrm{GHz}$

- Cellular frequencies: $900\,\mathrm{MHz}$ in Europe and Asia; $1900\,\mathrm{MHz}$ in the USA

13 Demographics

Location	Population	Known For
Canada	35.16 million	
USA	313.9 million	
Europe	739.2 million	
China	1.36 billion	
India	1.24 billion	
Indonesia	238 million	
Brazil	201 million	
Russia	144 million	
Japan	127 million	
Mexico	118 million	
Vietnam	90.4 million	
Germany	80.5 million	
France	65.8 million	
Great Britain	63.7 million	
Italy	59.9 million	
South Africa	53.0 million	
South Korea	50.2 million	
Spain	46.7 million	
Kenya	44.3 million	
Argentina	40.1 million	
Poland	38.5 million	
Malaysia	29.9 million	
Taiwan	23.4 million	
Australia	23.3 million	
Netherlands	16.8 million	
Belgium	11.2 million	
Greece	10.8 million	
Portugal	10.6 million	
Czech Republic	10.5 million	
Sweden	9.63 million	
Austria	8.50 million	
UAE	8.26 million	
Israel	8.09 million	
Hong Kong	7.18 million	
Denmark	5.62 million	
Singapore	5.40 million	
Scotland	5.30 million	
Ireland	4.59 million	

13.1 Todo

- population density

- population history

- cities, provinces, states

14 Geography

Location	Area	Width	Diagonal	Height
Canada	$9.98 \times 10^6 \, \text{km}^2$	4800 km (3000 miles)		
USA	$9.83 \times 10^6 \, \text{km}^2$	4180 km	4500 km (2800 miles)	
Russia	$17.1 \times 10^6 \, \text{km}^2$			
China	$9.71 \times 10^6 \, \text{km}^2$			
France	$675 \times 10^3 \, \text{km}^2$			
Spain	$503 \times 10^3 \, \text{km}^2$			
Japan	$378 \times 10^3 \, \text{km}^2$			
Germany	$357 \times 10^3 \, \text{km}^2$			
UK	$224 \times 10^3 \, \text{km}^2$			

14.1 Todo

- cities, provinces, states

15 Technology

- Apple A7 chip: over 1 billion transistors on 102 $102 \, \text{mm}^2$ die

16 Economy

16.1 Canada

- Rank: 11th

- GDP: $1.839 trillion

- GDP growth: 2.0%

- GDP per capita: $52300

- Inflation: 1.2%

- Population below poverty line: 9.4%

- Labour force: 18.89 million

- Labour force by occupation: 2% agriculture, 13% manufacturing, 6% construction, 76% services, 3% other

- Unemployment: 6.9

- Main industries: transportation equipment, chemicals, minerals, food products, wood and paper products, fish products, petroleum and natural gas

- Exports: $462.528 billion

- Export goods: motor vehicles and parts, industrial machinery, aircraft, telecommunications equipment, chemicals, plastics, fertilizers, wood pulp, timber, crude petroleum, natural gas, electricity, aluminum

- Export partners: 73.2% USA, 4.6% EU, 4.3% UK, 4.3% China, 3.4% Germany, 3.1% Israel

- Imports: %474.544 billion

- Import goods: machinery and equipment, motor vehicles and parts, crude oil, chemicals, electricity, durable consumer goods

- Import partners: 50.6% USA, 11.0% China, 6.2% UK, 6.2% Japan, 5.5% Mexico, 4.5% South Korea

- Gross external debt: $1.326 trillion

- Public debt: $582.2 billion (33.8% of GDP)

- Budget deficit: $18.9 billion

- Revenues: $682.5 billion

- Expenses: $749.5 billion

- Foreign reserves: $65.82 billion

16.2   China

- $18.103 trillion

- GDP per capita: $7583

- GDP growth in 1 year: 7.7%

- Inflation: 2.5%

- GDP by sector: 10.1% agriculture, 45.3% industry, 44.6% services

- Labour force: 795.5 million

- Exports: $2.21 trillion

- Export partners: 17.2% USA, 15.8% Hong Kong, 7.4% Japan, 4.3% South Korea

- Export goods: electrical and machinery, apparel, textiles, iron and steel, optical and medical equipment

- Imports: $1.95 trillion

- Import partners: 9.8% Japan, 9.2% South Korea, 7.1% USA, 5.1% Germany, 4.3% Australia

- Import goods: electrical and machinery, oil and mineral fuels, optical and medical equipment, metal ores, plastic, organic chemicals

- Gross external debt: $697.2 billion

- Public debt: 22.15% of GDP

- Revenues: $1.838 trillion

- Expenses: $2.031 trillion

- Foreign reserves: $3.44 trillion

16.3   Europe

Hmmmmm.

16.4   Russia

Hmmmmm.

16.5   India

Hmmmmm.

16.6   USA

- GDP: $16.66 trillion

- GDP per capita: $49 601

- Population below poverty line: 14.8%

- Labour force: 155.6 million

- Unemployed: 11.26 million

- Unemployment: 7.2%

- Average gross salary: $45 790

- Farming, forestry, fishing: 0.7%

- Manufacturing, extraction, transportation, crafts: 20%

- Managerial, professional, technical: 37%

- Sales, office: 24%

- Other: 18%

- Exports: $1.56 trillion

- Capital goods: 28%

- Industrial supplies and materials (excluding oil fuels): 25%

- Consumer goods (except automotive): 12%

- Automobiles and components: 9.4%

- Food and beverages: 8.6%

- Fuel oil, petroleum products: 7.6%

- Aircraft and components: 6%

- Other: 4%

- Export to Canada: 19%

- Export to Mexico: 14%

- Export to China: 7%

- Export to Japan: 4.5%

- Imports: $2.3 trillion

- Consumer goods (except automotive): 23%

- Capital goods (Except computing): 19%

- Industrial supplies (except crude oil): 18%

- Crude oil: 14%

- Automobiles and components: 13%

- Computers and accessories: 5.4%

- Food and beverages: 4.8%

- Other: 3%

- Import from China: 19%

- Import from Canada: 14%

- Import from Mexico: 12%

- Import from Japan: 6.4%

- Import from Germany: 4.7%

- Public debt: $17.091 trillion (107.2% of GDP)

- Budget deficit: $680 billion

- Revenues: $2.774 trillion

- Individual income tax: 46%

- Social insurance: 35%

- Corporate tax: 24%

- Other: 9.3%

- Expenses: $3.454 trillion

- Social security: 22%

- Defense: 18%

- Medicare: 13%

- Interest: 7.3%

- Medicaid: 7.1%

- Other: 32%

17 Animals

Hmmmmm.

18 Plants

Hmmmmm.

19 Biology

Hmmmmm.

20 Architecture

Hmmmmm.

21 Related rates

Hmmmmm.

22 Chemical properties

Hmmmmm.

23 History

Period	Begin	End
Ancient Greek (archaic)	900 BC	500 BC
Ancient Greek (classical)	500 BC	300 BC
Ancient Greek (hellenistic)	300 BC	600 AD
Roman empire (west)	27 BC	476 AD
Roman empire (east)	330	1453
Middle ages/Medieval period	400	1400
Renaissance	1300	1600
Industrial revolution	1760	1830
Baroque period	1590	1725
Classical period	1730	1820
Romantic period	1815	1910
WWI	1914	1918
WWII	1939	1945
Great Depression	1929	Late 1930s, Mid 1940s
French Revolution	1789	1799
First Crusade	1096	1099
Hundred Years' War	1337	1453

Person	Birth	Death	Description
Socrates	469 BC	399 BC	
Aristotle	384 BC	322 BC	
Julius Caesar (roman emperor)	100 BC	44 BC	
Augustus (roman emperor)	63 BC	14 AD	
Nero (roman emperor)	37	68	
Constantine I (roman emperor)	272	337	
Charlemange	740s	814	
Martin Luther	1483	1546	
Queen Elizabeth I	1533	1603	
James Watt	1736	1819	
Isaac Newton	1642	1727	
Gottfried Wilhelm Leibniz	1646	1716	
Albert Einstein	1879	1955	
Carl Friedrich Gauss	1777	1855	
Leonhard Euler	1707	1783	
Pythagoras	570 BC	495 BC	
Pierre de Fermat	1601	1665	
Blaise Pascal	1623	1662	
John Milton	1608	1674	
Shakespeare	1564	1616	
John Donne	1572	1631	
Robert Burns	1759	1796	
William Butler Yeats	1865 - 1939		
J.R.R. Tolkien	1892	1973	
Martin Luther King Jr.	1929	1968	
Captain George Vancouver	1757	1798	
Linus Torvalds	1969	na	
Steve Jobs	1955	2011	
Bill Gates	1955	na	
Larry Page	1973	na	
Sergey Brin	1973	na	
Eric Schmidt	1955	na	
James Gosling	1955	na	
Dennis Ritchie	1941	2011	
Ken Thompson	1943	na	
Bjarne Stroustrup	1950	na	
Guido van Rossum	1956	na	
Yukihiro Matsumoto	1965	na	
Geoffrey Chaucer	1343	1400	
William (I) the Conqueror	1028	1087	
Alexander (III of Macedon) the Great	356 BC	323 BC	

Event	Date	Description
Martin Luther's Ninety-Five Theses	1517 October 31	
American Declaration of Independence	1776 July 4	

24 Literature

Work	Date	Author
Beowulf	975 - 1025	Unknown
Hamlet	1599 - 1602	Shakespeare
King Lear	1603 - 1606	Shakespeare
Macbeth	1603 - 1607	Shakespeare
To a Mouse	1785	Robert Burns
Paradise Lost	1667	Milton
The Second Coming	1919	Yeats
Lord of the Rings	1954 - 1955	Tolkien
The Canterbury Tales	End of 1300s	Chaucer

25 Music

Piece	Date	Composer
Symphony 5	1804 - 1808	Beethoven
The Well Tempered Clavier	1722	Bach
Symphony 9	1824	Beethoven
Eine kleine Nachtmusik	1787	Mozart