Name Date

**Conversion Tables and Physical Constants**

Table 1 – English Weights and Measures Table 2 – SI Prefixes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Units of Length |  | **Factor** | **Prefix** | **Symbol** |
| Standard unit – inch (in. or “) |  | 1024 | yotta | Y |
| 12 inches | = | 1 foot (ft or ‘) |  | 1021 | zetta | Z |
| 3 feet | = | 1 yard (yd) |  | 1018 | exa | E |
| 16.5 feet | = | 1 rod (rd) |  | 1015 | peta | P |
| 5280 feet | = | 1 mile (mi) |  | 1012 | tera | T |
| Units of Weight |  | 109 | giga | G |
| Standard unit – pound (lb) |  | 106 | mega | M |
| 16 ounces (oz) | = | 1 pound |  | 103 | kilo | k |
| 2000 pounds | = | 1 ton (T) |  | 102 | hecto | h |
| Units of Volume |  | 101 | deka | da |
| *Liquid* |  | **100** | **BASE** |  |
| 8 ounces (fl oz) | = | 1 cup (c) |  | 10-1 | deci | d |
| 2 cups | = | 1 pint (pt) |  | 10-2 | centi | c |
| 16 ounces (fl oz) | = | 1 pint |  | 10-3 | milli | m |
| 2 pints | = | 1 quart (qt) |  | 10-6 | micro | µ |
| 4 quarts | = | 1 gallon (gal) |  | 10-9 | nano | n |
| *Dry* |  | 10-12 | pico | p |
| 2 pints (pt) | = | 1 quart (qt) |  | 10-15 | femto | f |
| 8 quarts | = | 1 peck (pk) |  | 10-18 | atto | a |
| 4 pecks | = | 1 bushel (bu) |  | 10-21 | zepto | z |
|  |  |  |  | 10-24 | yocto | y |

Table 3 – Conversion Table for Length

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **cm** | **m** | **km** | **in.** | **ft** | **mile** |
| 1 centimeter = | 1 | 10-2 | 10-5 | 0.3937 | 3.2804 x 10-2 | 6.2137 x 10-6 |
| 1 meter = | 100 | 1 | 10-3 | 39.37 | 3.2804 | 6.2137 x 10-4 |
| 1 kilometer = | 105 | 1000 | 1 | 3.937 x 104 | 3280.4 | 0.62137 |
| 1 inch = | 2.54 | 2.54 x 10-2 | 2.54 x 10-5 | 1 | 8.3333 x 10-2 | 1.5783 x 10-5 |
| 1 foot = | 30.48 | 0.3048 | 3.048 x 10-4 | 12 | 1 | 1.8939 x 10-4 |
| 1 mile = | 1.6093 x 105 | 1609.34 | 1.6093 | 6.336 x 104 | 5280 | 1 |
| 1 angström = 10-10 m | 1 fermi = 10-15 m |
| 1 nautical mile = 1852 m | 1 light-year = 9.460 x 1012 km |
| 1 yard = 3 feet | 1 parsec = 3.084 x 1015 km |
| 1 fathom = 6 feet | 1 Bohr radius = 5.292 x 10-11 m |

Table 4 – Conversion Table for Area

|  |  |
| --- | --- |
| **Metric** | **English** |
| 1 m2 | = | 10,000 cm2 | 1 ft2 | = | 144 in2 |
|  | = | 1,000,000 mm2 | 1 yd2 | = | 9 ft2 |
| 1 cm2 | = | 100 mm2 | 1 rd2 | = | 30.25 yd2 |
|  | = | 0.0001 m2 | 1 acre | = | 4840 yd2 |
| 1 km2 | = | 1,000,000 m2 |  | = | 43,560 ft2 |
|  |  |  | 1 mi2 | = | 640 acres |
|  | **m2** | **cm2** | **ft2** | **in2** |
| 1 m2 =  | 1 | 104 | 10.7639 | 1550 |
| 1 cm2 =  | 10-4 | 1 | 1.0764 x 10-3 | 0.155 |
| 1 ft2 =  | 9.2903 x 10-2 | 929.03 | 1 | 144 |
| 1 in2 =  | 6.4516 x 10-4 | 6.4516 | 6.9444 x 10-3 | 1 |
| 1 circular mil = 5.07 x 10-6 cm2 = 7.85 x 10-7 in2 |

Table 5 – Conversion Table for Volume

|  |  |
| --- | --- |
| **Metric** | **English** |
| 1 m3 | = | 106 cm3 | 1 ft3 | = | 1728 in3 |
| 1 cm3 | = | 10-6 m3 | 1 yd3 | = | 27 ft3 |
|  | = | 103 mm3 |  |  |  |
|  | **m3** | **cm3 or mL** | **L** | **ft3** | **in3** |
| 1 m3 =  | 1 | 106 | 1000 | 35.3147 | 6.1024 x 104 |
| 1 cm3 or mL=  | 10-6 | 1 | 1.00 x 10-3 | 3.5315 x 10-5 | 6.1024 x 10-2 |
| 1 liter (L) =  | 1.00 x 10-3 | 1000 | 1 | 3.5315 x 10-2 | 61.0237 |
| 1 ft3 =  | 2.8317 x 10-2 | 2.8317 x 104 | 28.3168 | 1 | 1728 |
| 1 in3 =  | 1.6387 x 10-5 | 16.3871 | 1.6287 x 10-2 | 5.787 x 10-4 | 1 |
| 1 U.S. fluid gallon = 4 U.S. fluid quarts = 8 U.S. pints = 128 U.S. fluid ounces = 231 in3 = 0.134 ft3 |
| 1 L = 1000 cm3 = 1.06 qt | 1 fl oz = 29.5 cm3 |
| 1 ft3 = 7.47 gal = 28.3 L | 1 m3 = 263.691 gallons 1 gallon = 3.79 x 10-3 m3 |

**Note for Table 6 below:** Quantities in the shaded areas are not mass units. When we write 1 kg “ = ” 2.2046 lb, this means that a kilogram is a mass that weighs 2.2046 pounds under standard conditions of gravity (*g* = 9.80 m/s2 = 32.2 ft/s2).

Table 6 – Conversion Table for Mass

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **g** | **kg** | **slug** | **oz** | **lb** | **ton** |
| 1 gram =  | 1 | 0.001 | 6.8522 x 10-5 | 3.5274 x 10-2 | 2.2046 x 10-3 | 1.1023 x 10-6 |
| 1 kilogram =  | 1000 | 1 | 6.8522 x 10-2 | 35.274 | 2.2046 | 1.1023 x 10-3 |
| 1 slug =  | 1.4594 x 104 | 14.5939 | 1 | 514.7848 | 32.174 | 1.6087 x 10-2 |
| 1 ounce =  | 28.3495 | 2.835 x 10-2 | 1.9426 x 10-3 | 1 | 6.25 x 10-2 | 3.125 x 10-5 |
| 1 pound =  | 453.592 | 0.4536 | 3.1081 x 10-2 | 16 | 1 | 5.00 x 10-4 |
| 1 ton =  | 9.0719 x 105 | 907.185 | 62.1619 | 3.2 x 104 | 2000 | 1 |

**Note for Table 7 below:** Quantities in the shaded areas are weight densities and, as such, are dimensionally different from mass densities. Note that Dw = Dmg, where: Dw = weight density, Dm = mass density, and g = 9.80 m/s2 = 32.2 ft/s2.

Table 7 – Conversion Table for Density

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **slug/ft3** | **kg/m3** | **g/cm3** | **lb/ft3** | **lb/in3** |
| 1 slug/ft3 =  | 1 | 515 | 0.515 | 32.2 | 1.86 x 10-2 |
| 1 kg/m3 =  | 1.94 x 10-3 | 1 | 0.001 | 6.24 x 10-2 | 3.61 x 10-5 |
| 1 g/cm3 =  | 1.94 | 1000 | 1 | 62.4 | 3.61 x 10-2 |
| 1 lb/ft3 =  | 3.11 x 10-2 | 16.0 | 1.69 x 10-2 | 1 | 5.79 x 10-4 |
| 1 lb/in3 =  | 53.7 | 2.77 x 104 | 27.7 | 1728 | 1 |

Table 8 – Conversion Table for Time

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **yr** | **day** | **h** | **min** | **s** |
| 1 year =  | 1 | 365 | 8.76 x 103 | 5.256 x 105 | 3.1536 x 107 |
| 1 day =  | 2.7397 x 10-3 | 1 | 24 | 1440 | 8.64 x 104 |
| 1 hour =  | 1.1416 x 10-4 | 4.17 x 10-2 | 1 | 60 | 3600 |
| 1 minute =  | 1.9026 x 10-6 | 6.94 x 10-4 | 1.67 x 10-2 | 1 | 60 |
| 1 second =  | 3.171 x 10-8 | 1.1574 x 10-5 | 2.7778 x 10-4 | 1.6667 x 10-2 | 1 |

Table 9 – Conversion Table for Speed

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **ft/s** | **km/h** | **m/s** | **mi/h** | **cm/s** | **knot** |
| 1 ft/s =  | 1 | 1.0973 | 0.3048 | 0.6818 | 30.48 | 0.5925 |
| 1 km/h =  | 0.9113 | 1 | 0.2778 | 0.6214 | 27.7778 | 0.540 |
| 1 m/s =  | 3.2808 | 3.60 | 1 | 2.2369 | 100 | 1.9438 |
| 1 mi/h =  | 1.4667 | 1.6093 | 0.447 | 1 | 44.704 | 0.869 |
| 1 cm/s =  | 3.2808 x 10-2 | 3.60 x 10-2 | 0.01 | 2.2369 x 10-2 | 1 | 1.9438 x 10-2 |
| 1 knot =  | 1.6878 | 1.852 | 0.5144 | 1.1508 | 51.4444 | 1 |

Table 10 – Size and Shape of the Earth

|  |  |  |
| --- | --- | --- |
| **Dimension** | **miles** | **kilometers** |
| Equatorial radius | 3963 | 6378 |
| Polar radius | 3950 | 6257 |
| Average radius | 3956 | 6371 |
| Equatorial circumference | 24,902 | 40,077 |

Table 11 – Areas of the Earth, Land, and Ocean

|  |  |
| --- | --- |
| **Part of Earth** | **Millions of** |
| **Square miles** | **Square kilometers** |
| Land (2.22%) | 57.5 | 149 |
| Ice sheets and glaciers | 6 | 15.6 |
| Oceans and seas (70.78%) | 139.4 | 361 |
| Land plus continental shelf | 68.5 | 177.4 |
| Oceans and seas minus continental shelf | 128.4 | 332.6 |
| Total area of the Earth | 196.9 | 510 |

Table 12 – Distribution of Land and Water on the Earth’s Surface

|  |  |  |
| --- | --- | --- |
| **Hemisphere** | **Land** | **Ocean** |
| Northern | 39.3% | 60.7% |
| Southern | 19.1% | 80.9% |

Table 13 – Heights and Depths of the Earth’s Surface

|  |  |  |
| --- | --- | --- |
| **Land** |  | **Oceans and Seas** |
| **Height** | **Feet** | **Meters** |  | **Depth** | **Feet** | **Meters** |
| Greatest height: | 29,028 | 8848 |  | Greatest known depth: | 36,200 | 11,035 |
| Mount Everest |  | Mariana Trench |
| Average height | 2757 | 840 |  | Average depth | 12,460 | 3,800 |

Table 14 – Average Temperatures and Salinity of the Oceans, Excluding Adjacent Seas

|  |  |  |
| --- | --- | --- |
|  | **Temperature (˚C)** | **Salinity (parts per thousand)** |
| Pacific (total) | 3.14 | 34.60 |
| North Pacific | 3.13 | 34.57 |
| South Pacific | 3.50 | 34.63 |
| Indian (total) | 3.88 | 34.78 |
| Atlantic (total) | 3.99 | 34.92 |
| North Atlantic | 5.08 | 35.09 |
| South Atlantic | 3.81 | 34.84 |
| Southern Ocean | 0.71 | 34.65 |
| World ocean (total) | 3.51 | 34.72 |

Table 15 – Characteristics of Trenches

|  |  |  |  |
| --- | --- | --- | --- |
| **Trench** | **Depth (km)** | **Length (km)** | **Average Width (km)** |
| Pacific Ocean |  |  |  |
| Kurile-Kamchatka Trench | 10.5 | 2,200 | 120 |
| Japan Trench | 8.4 | 800 | 100 |
| Bonin Trench | 9.8 | 800 | 90 |
| Mariana Trench | 11.0 | 2,550 | 70 |
| Philippine Trench | 10.5 | 1,400 | 60 |
| Tonga Trench | 10.8 | 1,400 | 55 |
| Kermadec Trench | 10.0 | 1,500 | 40 |
| Aleutian Trench | 7.7 | 3,700 | 50 |
| Middle America Trench | 6.7 | 2,800 | 40 |
| Peru-Chile Trench | 8.1 | 5,900 | 100 |
| Indian Ocean |  |  |  |
| Java Trench | 7.5 | 4,500 | 80 |
| Atlantic Ocean |  |  |  |
| Puerto Rico Trench | 8.4 | 1,550 | 120 |
| South Sandwich Trench | 8.4 | 1,450 | 90 |

Table 16 – Water Sources for the Major Ocean Basins

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ocean** | **Precipitation (cm/yr)** | **Runoff from Adjoining Land Areas (cm/yr)** | **Evaporation (cm/yr)** | **Water Exchange with Other Oceans (cm/yr)** |
| Atlantic | 78 | 20 | 104 | 6 |
| Arctic | 24 | 23 | 12 | 35 |
| Indian | 101 | 7 | 138 | 30 |
| Pacific | 121 | 6 | 114 | 13 |

Table 17 – Volume, Density, and Mass of the Earth and Its Parts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Part of Earth** | **Average Thickness or Radius (km)** | **Volume (km3)** | **Mean Density (g/cm3)** | **Mass (g)** | **Relative Abundance (%)** |
| Atmosphere | – | – | – | 5 x 1021 | 0.00008 |
| Oceans and seas | 3.8 | 1,370 | 1.03 | 1.41 x 1024 | 0.023 |
| Ice sheets and glaciers | 1.6 | 25 | 0.90 | 0.023 x 1022 | 0.0004 |
| Continental crust | 35 | 6,210 | 2.8 | 1.739 x 1025 | 0.29 |
| Oceanic crust | 8 | 2,660 | 2.9 | 7.71 x 1024 | 0.13 |
| Mantle | 2,881 | 898,000 | 4.53 | 4.068 x 1027 | 68.1 |
| Core | 3,473 | 175,500 | 10.72 | 1.881 x 1027 | 31.5 |
| Whole Earth | 6,371 | 1,083,230 | 5.517 | 5.976 x 1027 | – |