Units for Astronomical Distances

#63 of Gottschalk's Gestalts

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of the Organization & Exposition
of Mathematics
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GG63-2

☐ units of distance / length
used in astronomy

• in summary
astronomical unit
parsec
light - year
light - month
light - week
light - day
light - hour
light - minute
light - second

• astronomical unit

$=_{dn}$ au = AU ← astronomical unit

$=_{df}$ the mean distance of Earth from the Sun
wi the semimajor axis of Earth' s orbit
(original definition & now very close
to the present - day mechanical definition)

$= 1.495\,978\,706\,91 \times 10^{11}$ m

$\approx 1.5 \times 10^{11}$ meters

$= 149\,597\,870.691$ km

$\approx$ 150 million kilometers

$= 92\,955\,806$ mi

$\approx$ 93 million miles

$= 15.812\,84 \times 10^{-6}$ ly

$\approx$ 16 millionths of a light - year

$= 8.316\,746$ lm

$\approx 8\frac{1}{3}$ light - minutes

$= 499.004\,784$ ls

$\approx$ 500 light - seconds

• parsec

$=_{pr}$ par - sek

$=_{dn}$ pc $\leftarrow$ parsec

$=_{df}$ the distance of an object from the Sun
with a heliocentric parallax
of one second of arc

= the distance at which
one AU subtends one second of arc

$= 3.085\,677\,6 \times 10^{16}$ m

$\approx 3 \times 10^{16}$ meters

$= 3.085\,677\,6 \times 10^{13}$ km

$\approx$ 31 billion kilometers

= 206 264.806 AU

$\approx$ 206 thousand astronomical units

= 3.261 633 ly

$\approx 3\frac{1}{4}$ light - years

• parsec

↑

parallax of one second

= parallax - second

= par - sec

= parsec

ie

parsec

is a blend word of

parallax & second

• light - year

$=_{dn}$ ly $\leftarrow$ light - year

$=_{df}$ the distance
that light travels in a vacuum
in one sidereal year
of 365.2564 mean solar days

$= 9.460\,528\,4 \times 10^{15}$ m

$\approx 9\frac{1}{2}$ quadrillion meters

$= 9.460\,528\,4 \times 10^{12}$ km

$\approx 9\frac{1}{2}$ trillion kilometers

$= 5.879 \times 10^{12}$ mi

$\approx$ 6 trillion miles

$= 6.323\,972\,7 \times 10^{4}$ AU

$\approx$ 63 thousand astronomical units

$= 0.306\,594\,89$ pc

$\approx \frac{1}{3}$ of a parsec

• light - month

$=_{dn}$ lmo ← light - month

$=_{df}$ the distance
that light travels in a vacuum
in one month of 31 days

≈ 800 billion kilometers

≈ 500 billion miles

• light - week

$=_{dn}$ lw ← light - week

$=_{df}$ the distance
that light travels in a vacuum
in one week

≈ 180 billion kilometers

≈ 113 billion miles

• light - day

$=_{dn}$ ld $\leftarrow$ light - day

$=_{df}$ the distance
that light travels in a vacuum
in one day of 24 hours

$\approx$ 26 billion kilometers

$\approx$ 16 billion miles

• light - hour

$=_{dn}$ lh $\leftarrow$ light - hour

$=_{df}$ the distance
that light travels in a vacuum
in one hour

$\approx$ 1 billion kilometers

$\approx \frac{5}{8}$ of a billion miles

• light - minute

$=_{dn}$ lmin = lm ← light - minute = light - minute

$=_{df}$ the distance
that light travels in a vacuum
in one minute

≈ 17 million kilometers

≈ 11 million miles

• light - second

$=_{dn}$ lsec = ls ← light - second = light - second

$=_{df}$ the distance
that light travels in a vacuum
in one second

= 299 792.458 kilometers exactly
by the SI definition of meter

≈ 300 000 kilometers

≈ 186 282 miles