

Atoms to Universe
Physics 340
Assignment 2

1) Compare and contrast Ptolemy's and Kepler's model for the motion of the planets in at least 5 aspects. What were the advantages of Kepler's model?

2) Galileo saw that Venus had the full range of phases, from full to new and back again. What aspect of Ptolemy's model for Venus did this contradict?

3) From the point of view of Copernicus, what did Ptolemy's epicycles accomplish?

4) By what ratio do 6 Pythagorean tones miss being an octave? By what ratio do four Just thirds miss being an octave?

5) If one starts with the Just scale on C. Now go up a fifth to G. What notes would one have to change to make a just scale starting on G? By how much would one have to change the F to make it a perfect fourth above G?

[Brief table of commonly used prefixes: n = nano = 10^{-9} = 1/1,000,000,000
 μ = micro = 10^{-6} = 1/1,000,000
m = milli = 10^{-3} = 1/1,000
c = centi = 10^{-2} = 1/100
d = deci = 10^{-1} = 1/10
h = hecta = 10^2 = 100
K = kilo = 10^3 = 1000
M = Mega = 10^6 = 1,000,000
G = giga = 10^9 = 1,000,000,000]

It is interesting that in scientific notation, names are given only up to Y= Yotta = 10^{24} , whereas in classical Japanese there are names for numbers at least all the way up to 10^{52} .

http://en.wikipedia.org/wiki/Japanese_numerals.

(The Japanese use $10000=10^4$ as the multiple for names, rather than our 1000.) Why in the 16th century anyone would need to give such a large number a name I do not know. This aside is of course totally irrelevant to the course.

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