

Harmonic Resonance of Music

by A. True Ott, PhD

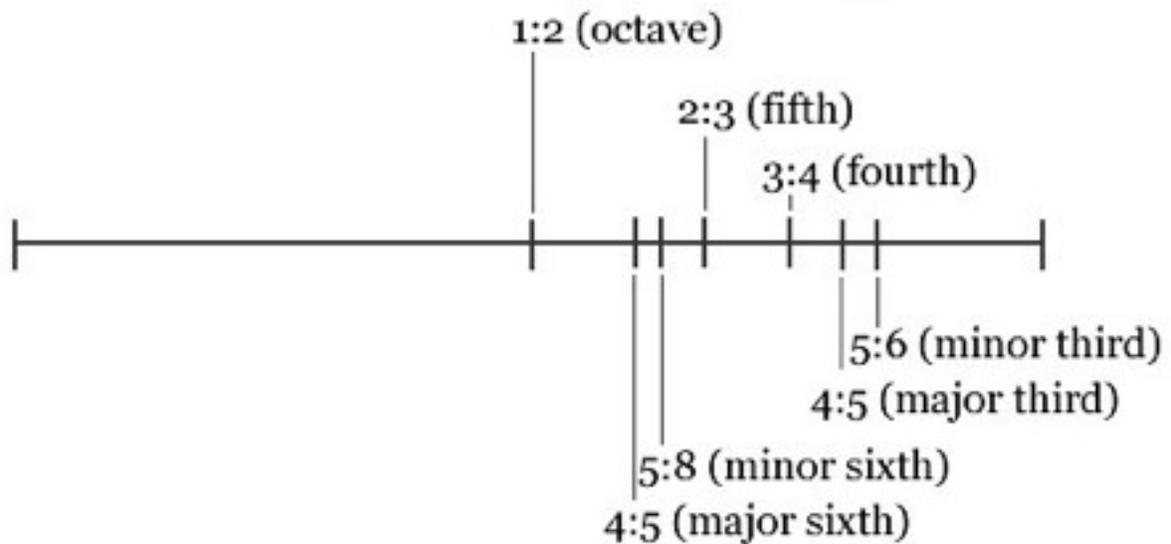
The Greek philosopher and mathematician Pythagoras of Samos (c. 580- c. 500 BCE) is credited with discovering that the harmonic intervals of what the world calls “music” correspond to unique whole number proportions or ratios. Dividing the vibrating string of a musical instrument in the ratio 1:2 produces the interval musicians call an "octave." Further dividing a string in a 3:2 ratio creates the interval we call the "fifth," producing the difference between the “tone” or “notes” *do* (typically middle “C”) and *sol* (the tone of “G). A musical “fourth,” is simply the difference between *do* and *fa*, and thus represents a 3:4 division of a string. This is how classical musicians tuned their instruments for generations, and is known simply as the “Pythagorean Tuning” or “Scientific Tuning” method.

Today, we recognize and understand that these musical intervals are produced by the specific rate of hertz (hz) vibration of a string,. For instance, in the case of an octave, doubling the rate of hertz (hz) vibration of a string (from 200 vibrations per second to 400) doubles the pitch correspondingly.

A "fifth," the difference between *do* and *sol*, could also be produced by two strings vibrating in the ratio of 200 to 300. In the case of CHORD STRUCTURES - we get HARMONIC RESONANCE by following the rule of 1 - 5 - 3. 1 being the base note, 5 being the 1st natural interval division note, and 3 being the 2nd NATURAL division. Thus the chord of C Natural is composed of the three notes C, G, and E. The 1-5-3- rule of chord harmonics is universal, and always produces a THREE-PRONGED HARMONY OF SOUND AND VIBRATION.

The 17th Century philosopher and musician Johannes Kepler expanded on the early work of Pythagoras. Kepler, after studying the orbital paths of the planets correctly deduced there are more than three actual “harmonic divisions” of the musical scale of the “natural” seven note musical scale. There are actually a total of SEVEN mathematically-based division ratios of each of the seven natural notes - a 5:6 (minor third), a 4:5 (major third), a 5:8 (minor sixth) and a 4:5 (major sixth).

Harmonic Divisions of a String



These are the mathematical ratios for creating the intervals that Kepler finds by experiment are both consonant with respect to the whole string and with each other.

Kepler sent his Magnus Opus book entitled Harmonices Mundi (The Harmony of the World) to the printer in the year 1619. What is amazing is that simply by applying the basic laws of mathematics and MUSIC to the structure of our solar system, he was able to accurately measure the orbital paths of planets as well as the measurement of time and space well before the advent of powerful telescopes and computers.

Consider just a few notable quotes from this remarkable man:

“Since geometry is co-eternal with the divine mind before the birth of things, God himself served as his own model in creating the world (for what is there in God which is not God?), and he with his own image reached down to humanity.”

“Geometry, coeternal with God and shining in the divine Mind, gave God the pattern... by which he laid out the world so that it might be best and most beautiful and finally most like the Creator.”

“I feel carried away and possessed by an unutterable rapture over the divine spectacle of heavenly harmony... I write a book for the present time, or for posterity. It is all the same to me. It may wait a hundred years for its readers, as God has also waited six thousand years for an onlooker.”

“We do not ask for what useful purpose the birds do sing, for song is their pleasure since they were created for singing. Similarly, we ought not to ask why the human mind troubles to fathom the secrets of the heavens. The diversity of the phenomena of nature is so great and the treasures hidden in the heavens so rich precisely in order that the human mind shall never be lacking in fresh nourishment.”

Kepler explained in the year 1618 that the Musical Harmonies outlined by Pythagoras were the exact, replicated structures of the “heavenly harmony” evidenced by what he termed the “sacred” science of geometry. Kepler declared that by understanding and applying the sacred harmonics of music, one could become

spiritually and mentally unified with the God of Nature in a very powerful manner. Modern mathematicians and philosophers have long debated what Kepler could have possibly meant by this - how can music science in any way match the core principles of geometry (earth (geo) measurements) such as the mathematical constant value e or the universal “radian”? Keep in mind that 17th century European music was universally “tuned” to A = 432 hz - and not the “modern” adulterated value of A=440 hz. When one analyzes the hz number values of the 12 note divisions of A = 440 hz. - nothing “exceptional” stands out whatsoever. However, when we do the mathematical divisions of Pythagorus/Kepler when A = 432, and precisely measure the hz numbers on a digital tuner to verify, look what we find:

	1st Octave	2nd Octave	3rd Octave
A 432	A 216	A 108	A 54
G# 407.73128	G# 203.86564	G# 101.93282	G# 50.96641
G 384.27772	G 192.13886	G 96.06943	G 48.034717
F# 361.91146	F# 180.95573	F# 90.477865	F# 45.238933
F 342.85714	F 171.42857	F 85.714285	F 42.857142
E 324	E 162	E 81	E 40.5
D# 305.79848	D# 152.89924	D# 76.44962	D# 38.22481
D 288	D 144	D 72	D 36
C# 272	C# 136	C# 68	C# 34
C 256.68508	C 128.34254	C 64.17127	C 32.085635
B 240.17358	B 120.08679	B 60.043395	B 30.021697
A# 229.18312	A# 114.59156	A# 57.29578	A# 28.64789
A 216	A 108	A 54	A 27

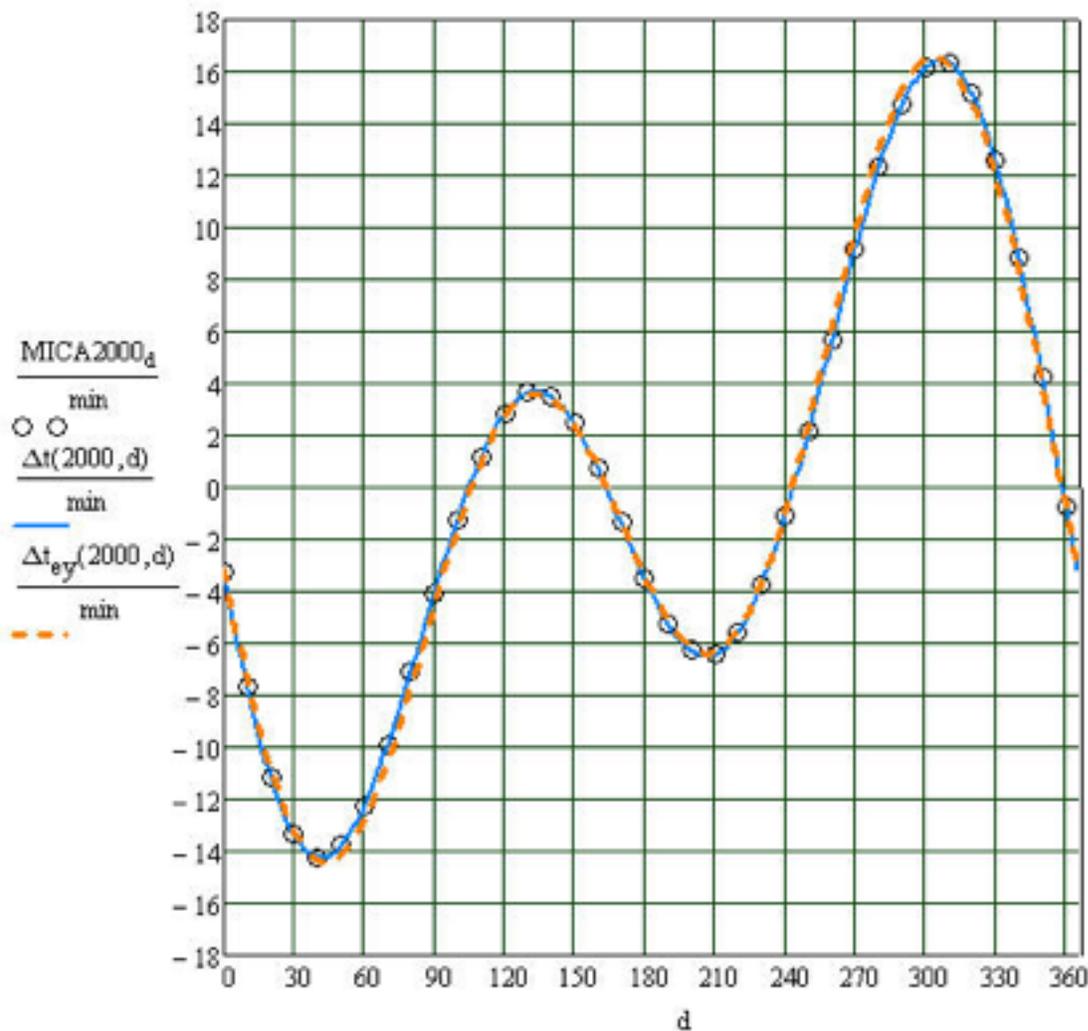
1. The hz vibrational number of the 2nd octave value of A# when concert A is tuned to 432 hz. equals EXACTLY the number 57.29578! Mathematicians and many scientists will

quickly recognize this number as The Radian, or Rad, (which is 180, a half circle, divided by 3.14159265 or Pi). This number “The Radian” is very significant, as it is the core measurement upon which the entire Earth grid of longitude and latitude (and thus our modern GPS system) is based, not to mention the cells and organ systems of the human body!

2. Another critically important geometrical number to the scientists is the mathematical constant (e) value 2.72. It is the core value of the “natural logarithm” which is what basically drives computers and the internet. In fact, in our contemporary internet/computer culture, individuals and organizations frequently pay homage to the number e . For instance, in the IPO filing for Google in 2004, rather than a typical round-number amount of money, the company announced its intention to raise \$2,718,281,828, which is e billion dollars rounded to the nearest dollar. Notice that C# on the 432 scale is the value of e minus its decimal points (or simply multiplied by 100) - 272.
3. Many “folk” songs that have been preserved over the centuries, (especially the “gaelic” tunes of Scotland and Ireland), are performed in the key (chord) of D. When A = 428, the note D measures a hertz frequency of 288. 288 just happens to be the exact measurement of the “outer circle” of Stonehenge, while the first octave of 144 is the numeric “gematria” value of the Hebrew word meaning “Light”, as well as the Greek word for BIBLE.
4. The second octave value of D equals 72, which is the exact measurement of years in a single degree measurement of the circle of time known as the “grand precession” of the Sun as it orbits the galaxy through the 12 constellations. (There are 360 degrees in a full circle - 72×360 equals 25,920 years in a full orbit.) Also notice that “time” is the measurement of the earth’s orbit and its yearly precession in relation to the sun, and so time is calculated based on 60 “seconds” and then “60

minutes”, 24 hours in a day. 25,920 divided by 60 equals 432.

5. The 3rd octave of D equals 36 hz - which is the exact hz frequency pulse of the “Lamp of Life” mineral called magnesium.
6. The value of E is 324 - which is the 1st equinox. The upper harmonic octaves of E are the exact astronomical measurements of the four equinoxes 324,648, 1296, and 2592!



7. The hz value for D# is extremely close to the sacred number 153. In fact, when playing D# on my 432-tuned piano, my

digital tuner showed the frequency to be exactly 153. To the Christian believer, this should be highly significant. In the Gospel of St. John, Chapter 21, we read of the resurrected Christ visiting some apostles who have gone back to their earlier profession of fishing. Christ tells them to cast their nets in a new way, and the end result is they catch exactly 153 fish in their net. Why 153? Suffice it to say in the amazing world of numbers - 153 is very, very special. First of all, it is the sum of all numbers from 1 to 17 ($1+2+3+4+5+6+7+8+9+10+11+12+13+14+15+16+17 = 153$) It's very unique mathematic qualities symbolize unity or ONENESS of all numbers, and of being "set apart from the world". In short, it symbolizes sanctification to the Christian. Also, it is the number sequence of the scale degrees of musical chords - 1-5-3.

As Johan Kepler discovered and documented over 400 years ago, the 12 "heavenly" number-based tones of MUSIC harmonize with the entire cosmos perfectly - and show this ONLY when "tuned" to A = 432 hz. How tragic it is that humanity has strayed from the "scientific" number-based tuning of the musical notes. Of course, the skeptic will mock and ridicule this as he/she ignores the mathematical law of probability and statistical sampling equations. A colleague conservatively determined that the chances of the 7 interconnected "features" of 432 hz. tuning happening strictly by random chance is roughly 1 in 4.3 billion.

Remember something called "Zoob's Law" which states: "Generally people tend to oppose that which they don't understand, the degree of their opposition being directly proportionate to their ignorance."