

Cello Standards: Tuning Drones

Open Strings Pitch Frequencies (Hz) using Pythagorean Tuning System (ratio - 3:2)			
Violin	Viola	Cello	Bass
E660	A440	A220	G97.777
A440	D293.333	D146.666	D73.333
D293.333	G195.555	G97.777	A55
G195.555	C130.369333	C65.184666	E41.25

Just Intonation

- A440 is a fixed pitch in every key
- Finding the Tonic of each key signature and how they relate to A440
- Finding the Tonic when A440 changes intervallic function

A440 as Interval:	Ratio (A440: Tonic)	Tonic (key of ~)	Octave 1 (Hz)	Octave 2 (Hz)	Octave 3 (Hz)	Octave 4 (Hz)	Octave 5 (Hz)	Octave 6 (Hz)
d1	24:25	A#	57.291666	114.58333	229.1666	458.333	916.666	1833.333
P1	1:1	A	55	110	220	440	880	1760
A1	25:24	Ab	52.8	105.6	211.2	422.4	844.8	1689.6
d2	128:125	Gx	53.7109375	107.421875	214.84375	429.6875	859.375	1718.75
m2	16:15	G#	51.5625	103.125	206.25	412.5	825	1650.75
M2	9:8	G	48.888	97.777	195.555	391.111	782.222	1564.444
A2	75:64	Gb	48.9333	93.8666	187.7333	375.4666	750.9333	1501.8666
d3	144:125	Fx	47.740555	95.48111	190.97222	381.444	762.888	1525.777
m3	6:5	F#	45.8333	91.666	183.333	366.666	733.333	1466.666
M3	5:4	F	44	88	176	352	704	1408
A3	125:96	Fb	42.24	84.48	168.96	337.92	675.84	1351.68
d4	32:25	E#	42.96875	85.9375	171.875	343.75	687.5	1375
P4	4:3	E	41.25	82.5	165	330	660	1320
A4	25:18	Eb	39.6	79.2	158.4	316.8	633.6	1267.2
d5	36:25	D#	38.19444	76.3888	152.777	305.555	611.111	1222.222
P5	3:2	D	36.666	73.333	146.666	293.333	586.666	1173.333
A5	25:16	Db	35.2	70.4	140.8	281.6	563.2	1126.4
d6	192:125	Cx	35.807291666	71.61458333	143.2291666	286.0458333	572.91666	1145.8333
m6	8:5	C#	34.35	68.7	137.5	275	550	1100
M6	5:3	C	33	66	132	264	528	1056
A6	125:72	Cb	31.68	63.36	126.72	253.44	506.88	1013.76
d7	128:75	B#	32.07291666	64.453125	128.90625	257.8125	515.625	1031.25
m7	16:9	B	30.9375	61.875	123.75	247.5	495	990
M7	15:8	Bb	29.333	58.666	117.333	234.666	469.333	938.666
A7	125:64	Bbb	28.16	56.32	112.64	225.28	450.56	901.12
d8	48:25	A#	28.6458333	57.291666	114.58333	229.1666	458.333	916.666
P8	2:1	A	27.5	55	110	220	440	880

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Just Intonation

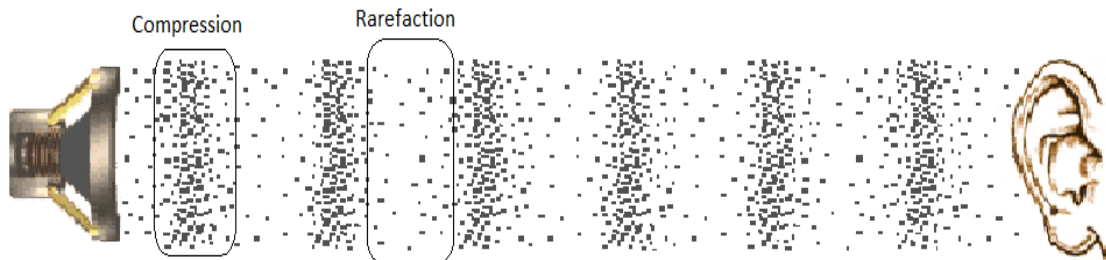
- A440 is a fixed pitch in every key
- Finding the Tonic of each key signature and how they relate to A440
- Finding the Tonic when A440 changes intervallic function

A440 as Interval:	Ratio (A440:Tonic)	Tonic (key of ~)	Octave 1 (Hz)	Octave 2 (Hz)	Octave 3 (Hz)	Octave 4 (Hz)	Octave 5 (Hz)	Octave 6 (Hz)
d1	24:25	A#	57.29	114.58	229.16	458.33	916.66	1833.33
P1	1:1	A	55	110	220	440	880	1760
A1	25:24	Ab	52.80	105.60	211.20	422.40	844.80	1689.60
d2	128:125	Gx	53.71	107.42	214.84	429.68	859.37	1718.75
m2	16:15	G#	51.56	103.12	206.25	412.50	825	1650.75
M2	9:8	G	48.88	97.77	195.55	391.11	782.22	1564.44
A2	75:64	Gb	48.93	93.86	187.73	375.46	750.93	1501.86
d3	144:125	Fx	47.74	95.48	190.97	381.44	762.88	1525.77
m3	6:5	F#	45.83	91.66	183.33	366.66	733.33	1466.66
M3	5:4	F	44	88	176	352	704	1408
A3	125:96	Fb	42.24	84.48	168.96	337.92	675.84	1351.68
d4	32:25	E#	42.96	85.93	171.87	343.75	687.50	1375
P4	4:3	E	41.25	82.50	165	330	660	1320
A4	25:18	Eb	39.60	79.20	158.40	316.80	633.60	1267.20
d5	36:25	D#	38.19	76.38	152.77	305.55	611.11	1222.22
P5	3:2	D	36.66	73.33	146.66	293.33	586.66	1173.33
A5	25:16	Db	35.20	70.40	140.80	281.60	563.20	1126.40
d6	192:125	Cx	35.80	71.61	143.22	286.04	572.91	1145.83
m6	8:5	C#	34.35	68.70	137.50	275	550	1100
M6	5:3	C	33	66	132	264	528	1056
A6	125:72	Cb	31.68	63.36	126.72	253.44	506.88	1013.76
d7	128:75	B#	32.07	64.45	128.90	257.81	515.62	1031.25
m7	16:9	B	30.93	61.87	123.75	247.5	495	990
M7	15:8	Bb	29.33	58.66	117.33	234.66	469.33	938.66
A7	125:64	Bbb	28.16	56.32	112.64	225.28	450.56	901.12
d8	48:25	A#	28.64	57.29	114.58	229.16	458.33	916.66
P8	2:1	A	27.50	55	110	220	440	880

Cello Standards: Equal Temperament

(Tuner's set Pitches)

<u>A</u>	<u>C#/Db</u>	<u>F</u>
27.5000	34.6478	43.6535
55	69.2957	87.3071
110	138.5913	174.6141
220	277.1826	349.2282
440	554.3653	698.4565
880	1108.731	1396.913
1760	2217.461	2793.826
3520	4434.922	5587.652
<u>A#/Bb</u>	<u>D</u>	<u>Gb</u>
29.1352	36.7081	46.2493
58.2705	73.4162	92.4986
116.5409	146.8324	184.9972
233.0819	293.6648	369.9944
466.1638	587.3295	739.9888
932.3275	1174.659	147.978
<u>B</u>	<u>D#/Eb</u>	<u>G</u>
30.8677	38.8909	48.9994
61.7354	77.7817	97.9989
123.4708	155.5635	195.9977
246.9417	311.1270	391.9954
493.8833	622.2540	783.9909
987.7666	1244.508	1567.982
1975.533	2489.016	3135.963
3951.066	4978.032	6271.927
<u>C</u>	<u>E</u>	<u>G#/Ab</u>
32.7032	41.2034	51.9131
65.4064	82.4069	103.8262
130.8128	164.8138	207.6523
261.6256	329.6276	415.3047
523.2511	659.2551	830.6094
1046.502	1319.510	1661.219
2093.005	2637.020	3322.438
	5274.041	6644.875



*Pitch frequency (Hz) counts the number of compressions per second (of air particles).