

Music

Harmonic Sequence

$$1x, 2x, 3x, 4x, 5x, \dots$$

$$x/1, x/2, x/3, x/4, x/5, \dots$$

Simple Ratios

$$2:1, 3:2, 4:3, 5:3, 5:4, 7:4, 6:5, 7:5, 8:5, 9:5, 7:6, 11:6, \text{ etc.}$$

Intervals

$$\text{“octave”} \quad 2:1$$

$$\text{“fifth”} \quad 3:2$$

$$\text{“fourth”} \quad 4:3$$

Circle of fifths.

Tempered Tuning

$$n \quad \text{notes per octave}$$

$$N \quad \text{note number}$$

$$x \quad \text{note frequency}$$

$$x_0 \quad \text{reference frequency, usually 440Hz for A4}$$

$$x = x_0 \, 2^{N/n} \tag{1}$$

$$N = n \log_2(x/x_0) \tag{2}$$

With twelve notes per octave we have: A, A \sharp , B, C, C \sharp , D, D \sharp , E, F, F \sharp , G, G \sharp , (repeat) with the note number of A4 being 0, A \sharp 4 being 1, etc.