

# 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, etc.

## Intervals

“octave” 2:1

“fifth” 3:2

“fourth” 4:3

Circle of fifths.

## Tempered Tuning

$n$  notes per octave

$N$  note number

$x$  note frequency

$x_0$  reference frequency, usually 440Hz for A4

$$x = x_0 2^{N/n} \quad (1)$$

$$N = n \log_2(x/x_0) \quad (2)$$

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.