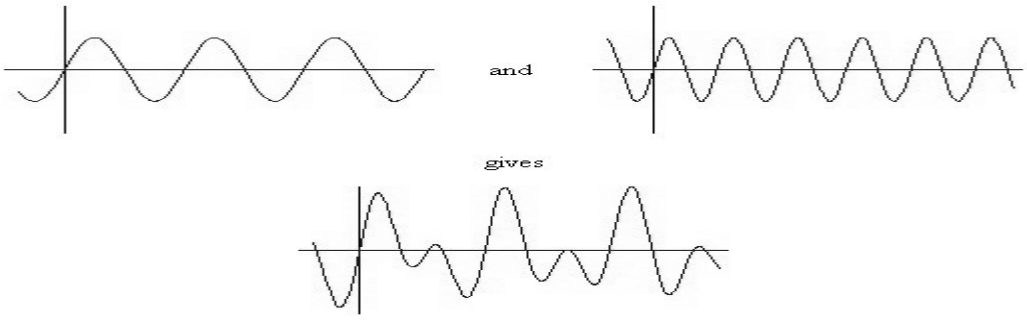
Sound Waves: Complexities

Complex Waves: Combination of many sine waves…what we hear everyday.
An instrument makes a complex wave.
A combination of instruments makes an even more complex wave.
A combination of instruments and talking make an even more complex wave…



Octaves= doubling the frequency ($f \times 2^{n+1}$)
Harmonics= multiples of the fundamental frequency ($f \times n+1$)
(where "n" is 0,1,2,3...)
Overtones= all sound above the fundamental frequency
Formants= emphasis on a range of overtones (example: vowels, overtone singing)
Timbre= Differences in the combination of harmonics explaining why instruments sound different even while playing the same note/fundamental frequency (more/less of certain harmonics)

<u>Harmonics/Overtone Series</u>
Fx1, fx2, fx3, fx4, fx5, fx6, fx7, fx8, fx9, fx10, fx11, fx12, fx13, fx14, fx15, fx16
Root, P8, P5, P8, M3, P5, flatm7, P8, M2, M3, flatTT, P5, flat6, flatm7, flatM7, P8