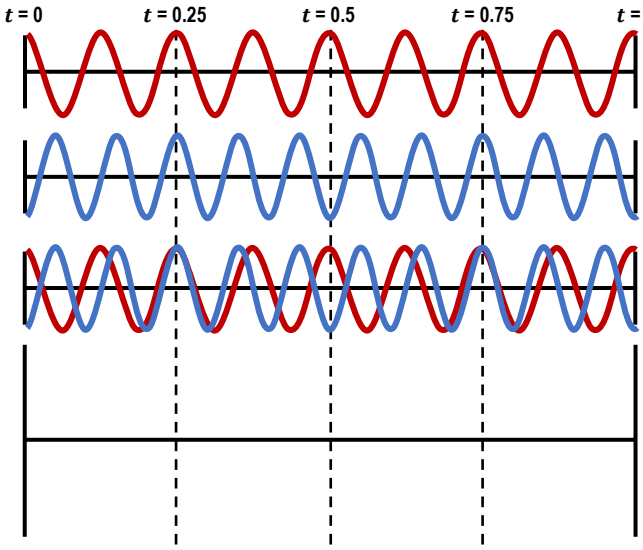
CONCEPT: BEATS

- **Beats** are oscillations in *Amplitude* that occur when 2 sound waves with _____ frequencies interfere.
  - The **beat frequency** is the # of oscillations or # of Amplitudes you hear per second.



f_a = ___ Hz

f_b = ___ Hz

_____ Interference

_____ Interference

- **Beat** Amplitude: _____ the original Amplitude
- **Beat** Frequency: f_{beat} = _____

f_{beat} = _____ = ___ Hz

f_{sound} = (_____) = ___ Hz

- The resulting sound you hear has a frequency (pitch) of $f_{sound} = \left(\frac{f_a + f_b}{2}\right)$, but the *Amplitude* (loudness) varies at f_{beat}.

EXAMPLE: Two musicians try to play the same note, which has a wavelength of 65cm, at the same time. Sadly, one of the instruments is out of tune and plays a note with a wavelength of 65.4cm. What is the frequency of the beats the musicians hear? *Assume the speed of sound is 343 m/s*.