Answer on Question#54675, Physics/Mechanics | Kinematics | Dynamics

I) Using formula for sum of two sine functions, obtain:

$$y_1+y_2=a\sin(w_1t-k_1x)+a\sin(w_2t-k_2x)=2a\sin\left((w_1+w_2)\frac{t}{2}-(k_1+k_2)\frac{x}{2}\right)\cos\left((w_1-w_2)\frac{t}{2}-(k_1-k_2)\frac{x}{2}\right)$$

II) The resulting wave is a sine wave with frequency $\frac{(w_1+w_2)}{2}$ with enveloping cosine function of frequency $\frac{w_1-w_2}{2}$. Because the frequencies of the initial two waves are not equal but almost the same, the enveloping cosine function has a small frequency(big period). This phenomenon is called beats. For equal frequencies of incident waves, the beats do not occur.