

PHY102
Physics of Music-Spring 2008
Due before class on February 27

1) Two sine waves with frequencies 300Hz and 302Hz are played simultaneously.

- Calculate the frequency of the “beats”. (Don’t use a canned formula here, come up with an argument to back up your result).
- Can you find the frequency of the beats for two generic frequencies f_1 and f_2 ?

Hint: you can use wave generator software readily available on the web to generate two sine waves with similar frequencies, count how many beats you get after, say, 10 s, and verify your formula above. If you do that, include a very short description of it for lots of extra credit.

2) Plot (by hand) the following functions:

- $2 \sin(2 \pi t + \pi/2)$
- $-\sin(4\pi t)$
- $2 \sin(2 \pi t + \pi/2) - \sin(4 \pi t)$

At $t=0$ do we have constructive or destructive interference of the two waves?

4) **Estimate** how many cd’s one 4-member band has to sell if they are to keep a middle-class standard of living for 30 years having as their main source of income the approximately 20% of the cover price of the cd’s they sell.

(There’s considerable latitude here in defining what “middle-class” is as well as other factors. Do your best to estimate them and explain your reasoning)