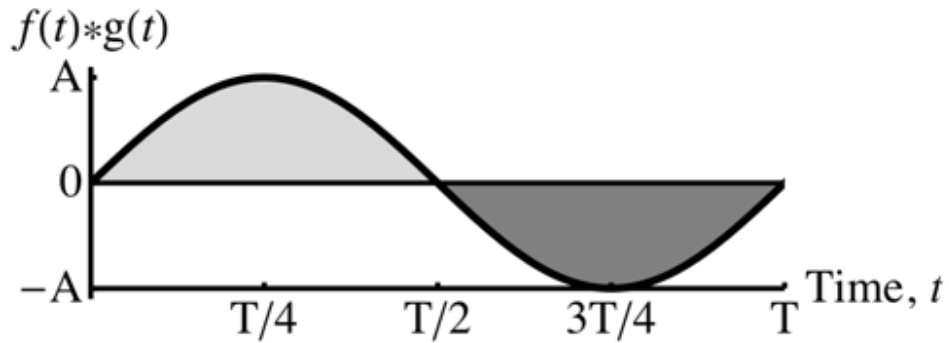


FOURIER ANALYSIS - PROJECTIONS OF HARMONIC FUNCTIONS (SOLUTIONS)

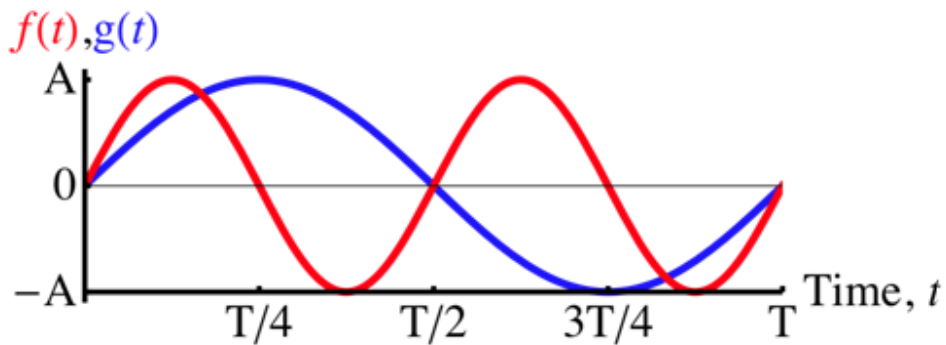
Work in groups at the whiteboards and remember to assign roles of taskmaster, cynic, and recorder. No calculators or computers for this exercise, please! The reason is that you must be able to quickly recognize the positions of the zeroes and maxima/minima of the basic harmonic functions, gain insight into symmetry, and practice some algebra skills.

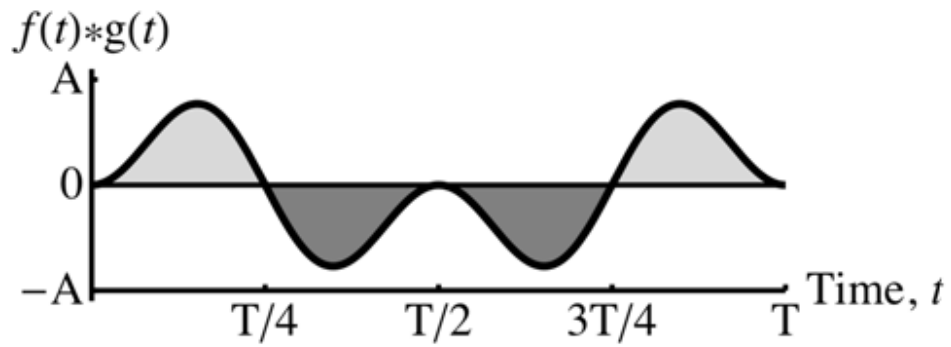
1. Draw graphs of the following functions and establish graphically whether the integral of the given functions over the time interval $T = 2\pi/\omega$ are zero or non-zero.

Even Groups: (i) $\sin(\omega t)$

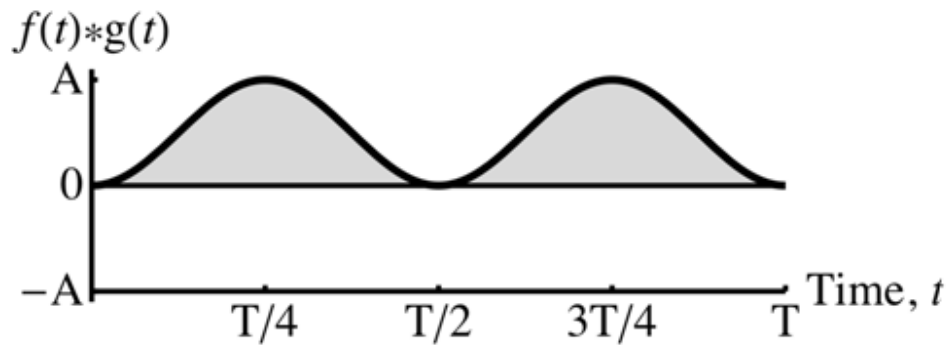
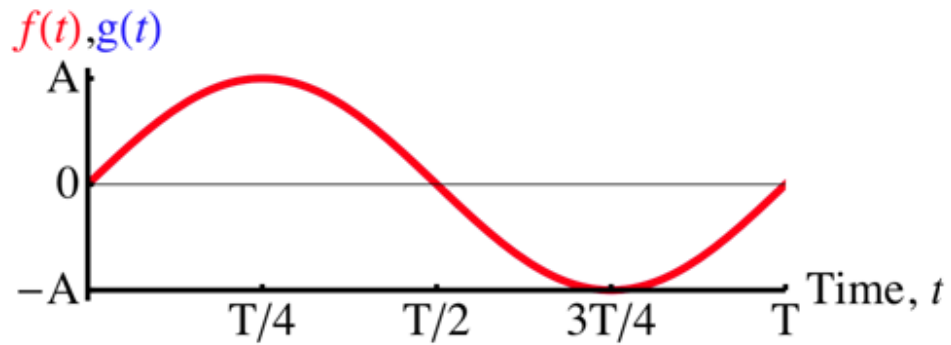


(ii) $\sin(\omega t) \sin(2\omega t)$

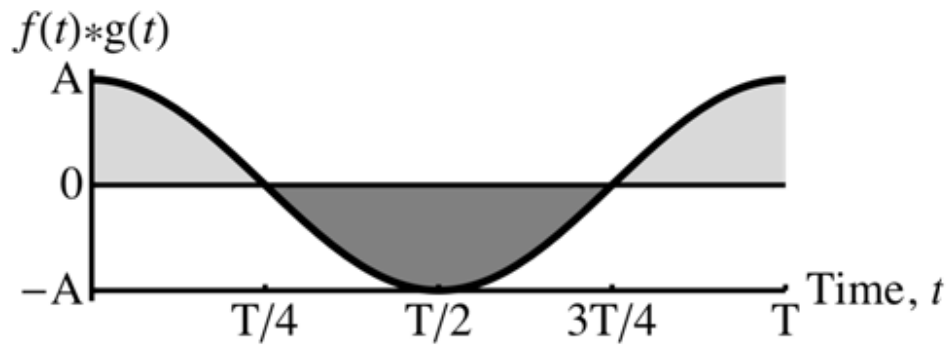




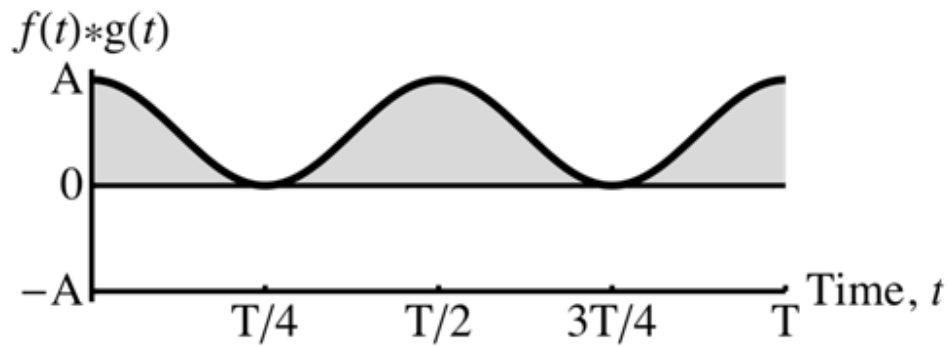
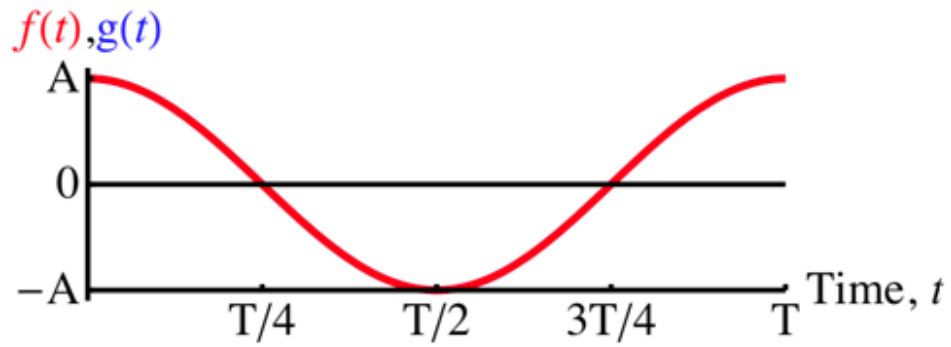
(iii) $\sin^2(\omega t)$



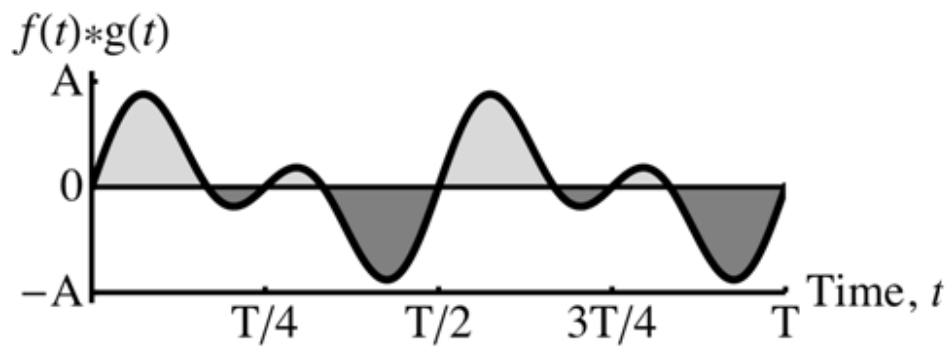
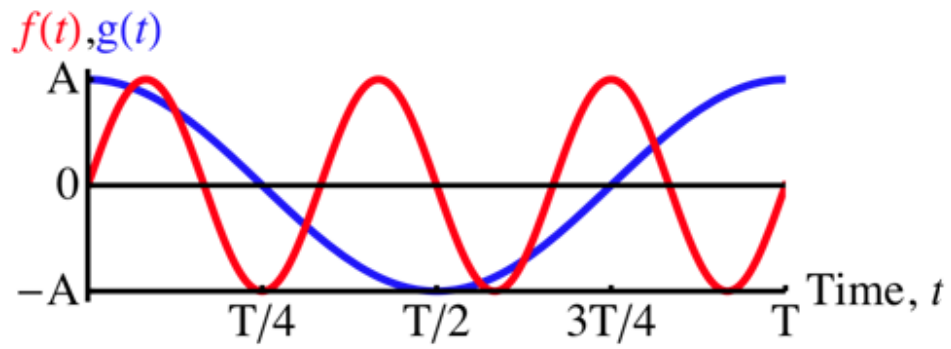
Odd Groups: (i) $\cos(\omega t)$



(ii) $\cos^2(2\omega t)$



(iii) $\cos(\omega t) \sin(3\omega t)$



by Janet Tate
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