PROBLEM:

Consider a signal $x(t)$ such that

$$x(t) = 2\cos(\omega_1 t)\cos(\omega_2 t) = \cos[(\omega_2 + \omega_1)t] + \cos[(\omega_2 - \omega_1)t]$$

where $0 < \omega_1 < \omega_2$.

(a) What is the general condition that must be satisfied by $\omega_2 - \omega_1$ and $\omega_2 + \omega_1$ so that $x(t) = x(t + T_0)$; i.e., so that $x(t)$ is *periodic* with period T_0? In addition, determine T_0 in terms of ω_1 and ω_2.

(b) What does the result of part (a) imply about ω_1 and ω_2?