Physics 267: Problem #1

A source located at the origin generates waves with the form

$$y(x,t) = A\cos(kx - \omega t)$$

a)

A second identical source is also placed at the origin. What is the sum of the two generated waves at $x > 0$?

b)

If the second source is decreased in amplitude by 50% and moved to $x = -\lambda/3$, what is the sum of the two generated waves at $x > 0$? Write your answer in the form $y_{total} = C\cos(kx - \omega t + \phi)$ where C and ϕ are functions of A, k and ω.

Hints: Waves add linearly. Use a phasor approach for part b.