- Consider two speakers emitting sound at the same volume with frequency $f = 800\,\text{Hz}$. One speaker is located at the origin, and the other on the $y$ axis at $y = 2\,\text{m}$. At what locations on the positive $x$ axis is the interference completely constructive? At what points is it completely destructive?

  Now we decrease $f$ until there are no longer any points of completely destructive interference on the positive $x$ axis. How low must $f$ be for this to occur?

- A police car is waiting on the shoulder of Lake Shore Drive. In order to catch speeding commuters, the officer uses a radar gun that emits sound of frequency $10.5\,\text{GHz}$. There is a single speeding car on the road, which is directly in front of or behind her. When she fires the gun, the frequency that returns from the speeder's car is $12.5\,\text{GHz}$. What is the speed of the car? Is it moving toward the officer, or away from her?

  A few moments later, the officers takes off at $35\,\text{m}\,\text{s}^{-1}$ in pursuit of the speeder, who does not change his speed. If the officer fires the gun now, what frequency will she receive?