Sound problems:

(Generally in these problems, we will take the speed of sound at normal temperature and pressure to be 343 m/s.)

These problems are mostly taken from our textbook, Pearson Physics by Walker, chapter 14..

1. Sitting in the outfield bleachers, 170 m from home plate you see a batter hit the ball for a home run. How long after you see the ball hit do you hear the crack of the bat?
2. At Zion National Park, a loud shout produces an echo 1.75 seconds later from a cliff. How far away from the shouter is the cliff?
3. Two musicians are comparing their clarinets. The first clarinet produces a tone that is known to be 441 Hz. When the two clarinets are played together, they produce 8 beats every 2.00 seconds. What are the possible frequencies of the second clarinet?
4. Two tuning forks have frequencies of 268 Hz and 272 Hz. What is the beat frequency if they are sounded together?
5. A person travels toward a stationary source of sound. Is the observed frequency of the sound greater than, less than, or the same as when the person is at rest?
6. You see lightning and then 2.3 seconds later you hear thunder. How far away was the lightning?
7. Concert A has a pitch of 440 Hz. Calculate the wavelength of that sound.
8. Red light has a longer wavelength than blue light, but they both travel as the same speed. Which has the higher frequency?

Answers:

1. 0.50 seconds
2. 300 meters
3. 437 Hz, 445 Hz
4. 4 Hz
5. Greater than
6. 789 m
7. 0.78 m
8. blue