Honors Physics Sound Problems

1. In a *Star Trek* episode, a space station orbiting Tanuga IV blows up. The crew of the *Enterprise* immediately hears and sees the explosion; they realize there is no chance for a rescue. If you had been hired an as advisor, what two physics errors would you have found and corrected?
2. A rifle is fired in a valley with parallel vertical walls. The echo from one wall is heard 2.0 s after the rifle is fired. The echo from the other wall is heard 2.0 s after the first echo. How wide is the valley?
3. Recall the Doppler shift equation:

A train moving toward a detector at 31 m/s blows a 305 Hz horn. What frequency is detected by A) a stationary train? B) a train moving toward the first train at 21 m/s?

1. The train in problem 3 is moving away from the detector. Now what frequency is detected by A) a stationary train? B) a train moving away from the first train at 21 m/s?