Doppler Effect

1. Two fire trucks with sirens on speed towards and away from an observer as shown below.
   a. Which truck produces a higher than normal siren frequency?
   b. Which truck produces a lower than normal siren frequency?

2. What is the frequency heard by a person driving at 15 m/s toward a blowing factory whistle (800. Hz) if the speed of sound is 340.6 m/s? *(835 Hz)*

3. From the previous problem, what frequency would he hear after passing the factory if he continues at the same speed? *(765 Hz)*

4. A car approaching a stationary observer emits 450. Hz from its horn. If the observer detects a frequency of 470. Hz, how fast is the car moving? The speed of sound is 343 m/s. *(15m/s)*

5. While standing near a railroad crossing, a person hears a distant train horn. According to the train's engineer, the frequency emitted by the horn is 440 Hz. The train is traveling at 20.0 m/s and the speed of sound is 346 m/s.
   a. What would be the frequency of the train's horn if the train were at rest? *(440 Hz)*
   b. What is the adjusted frequency that reaches the bystander as the train approaches the crossing? *(467 Hz)*
   c. What is the adjusted frequency that reaches the bystander once the train has passed the crossing? *(416 Hz)*

6. A cop car's siren has a frequency of 700. Hz. If you are standing on the sidewalk as the cop car approaches you at a speed of 15.0 m/s, what frequency would you hear? The speed of sound is 343 m/s. (*732Hz*)

7. An alarm clock is dropped off the edge of a tall building. You, standing directly under it, hear a tone of 1350. Hz coming from the clock at the instant it hits the ground. Since you know the building is 25.0 m tall, you can find out what the frequency of the alarm would be if you had just held it in your hands. What would that frequency be? The speed of sound is 343 m/s. *(1263Hz)*

8. Two identical cars are driving toward one another and sounding their horns. You're the driver of one of the cars. You measure your car's horn to be sounding at 512 Hz, but you measure the horn of the other car to be sounding at 600. Hz. The speed of sound is 345 m/s. If you are traveling at 26.8 m/s (60 mph), how fast is the other car traveling? (*27.7 m/s*)