Unit 09 Review Problems (Sound & Light)

$$v = f\lambda \qquad\qquad f = f_s \left(\frac{v \pm v_o}{v \mp v_s} \right)$$

speed of sound in air $= 343\,\mathrm{m/s}$ speed of light $= 3.0 \times 10^8\,\mathrm{m/s}$

1. You are driving **north** at 17 m/s when you see a police car in your rearview mirror that is also driving **north**, but at 32 m/s.

   (a) If the police car produces a frequency of 6000 Hz, what frequency do you hear?

   (b) You pull over to the side of the road and come to a stop as the police car approaches, what sound do you hear now?

   (c) You are still at rest at the side of the road, but the cruiser now passes you. What sound do you now hear?

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2. Red light has a wavelength of $5.90 \times 10^{-7}\,\mathrm{m}$. What is the frequency of red light?

3. Find the wavelength of a $10\,000\,\mathrm{Hz}$ sound when it travels through the air.