

46. The Doppler effect formula, Eq. 18-47, and its accompanying rule for choosing  $\pm$  signs, are discussed in §18-8. Using that notation, we have  $v = 343$  m/s,  $v_D = v_S = 160000/3600 = 44.4$  m/s, and  $f = 500$  Hz. Thus,

$$f' = (500) \left( \frac{343 - 44.4}{343 - 44.4} \right) = 500 \text{ Hz} \implies \Delta f = 0 .$$