

F15. Our analysis for determining the speed of sound assumed that the sound wave had infinitesimal strength. But for the 120 dB sound waves produced by *Linkin Park* near the stage, this assumption may be suspect.

a) One suitable definition of sound dB level is:

$$\text{dB} = 20 \log_{10} \left(\frac{\Delta p}{20 \times 10^{-6} \text{ Pa}} \right)$$

where Δp is a pressure variation caused by an average passing sound wave. Treating this sound wave as a shock wave, determine its propagation Mach number into still air.

Hint: Put the propagating-shock situation into the shock's frame of reference.

b) Determine the temperature fluctuations associated with the passing waves. Would you say *Linkin Park* makes strong or wimpy shock waves?