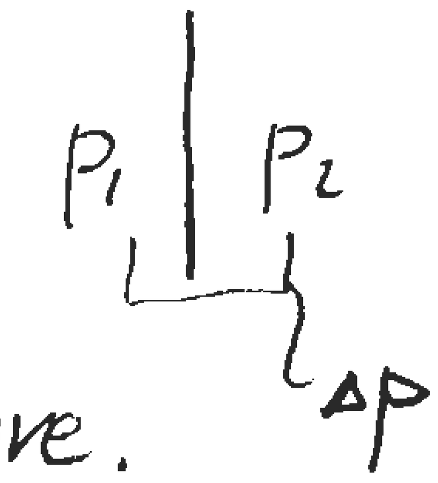
a) $dB = 20 \log_{10}\left(\frac{\Delta p}{20\times10^{-6} Pa}\right) = 120 \rightarrow \Delta p = 20 \, Pa$



This Δp is the pressure change across a shock (sound) wave.

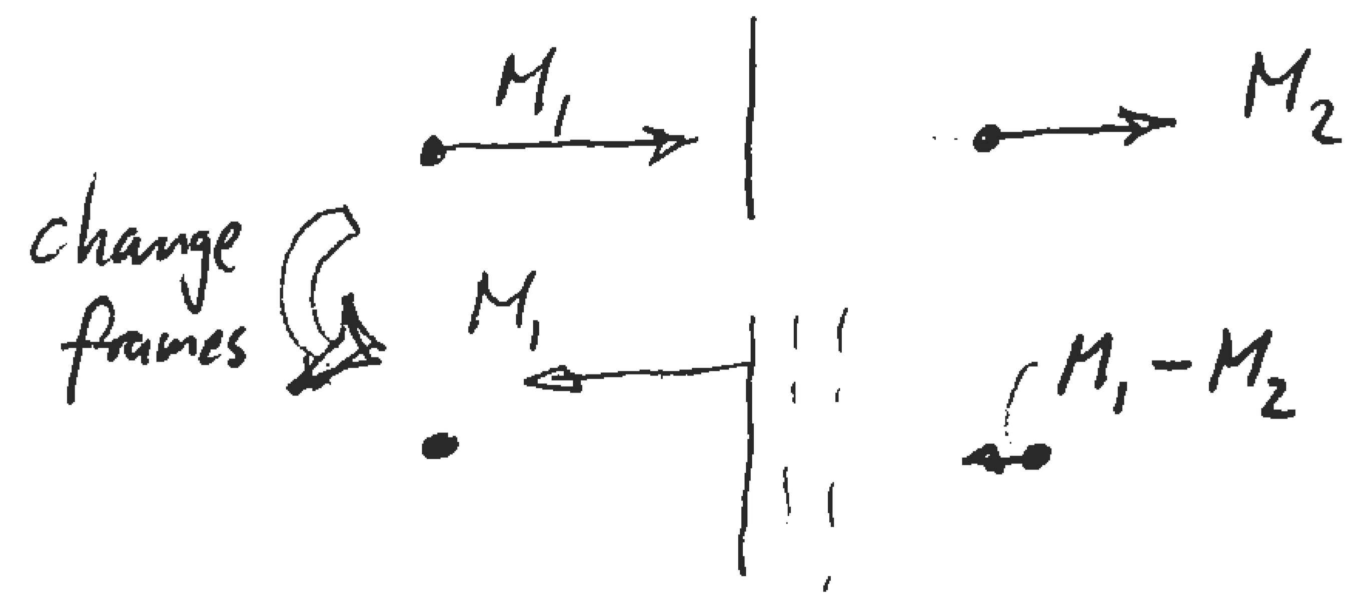
$\Delta p = p_2 - p_1$ where $p_1 \simeq 10^5 \, Pa$ (atmosphere, sea level)

$$\frac{p_2}{p_1} = \frac{p_1 + \Delta p}{p_1} = 1 + \frac{\Delta p}{p_1} = 1 + \frac{20}{10000} = 1 + \frac{2\gamma}{\gamma+1}(M_1^2 - 1)$$

$$\Rightarrow M_1^2 = 1.000171, \quad \boxed{M_1 = 1.000086}$$ weak

This M_1 is the Mach number of the sound wave propagating into still air.

$u_1 \approx a_1$ (weak shock)



b) $$\frac{T_2}{T_1} = \left[1 + \frac{2\gamma}{\gamma+1}(M_1^2 - 1)\right] \frac{2 + (\gamma-1)M_1^2}{(\gamma+1)M_1^2} = 1.000057$$

For $T_1 = 300 \, K^\circ$, $T_2 = 300.017^\circ$

$$\boxed{\Delta T = 0.017 \, K^\circ}$$ pretty wimpy.