HW 12-3 Soln)

We'll assume that the sound is radiated isotropically. Need to find the distances between the firecracker and each of the persons.

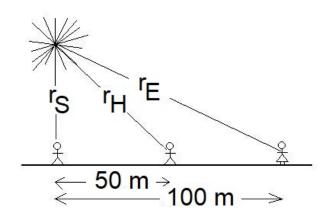
$$r_S = 100 \text{ m}$$

$$r_H = \sqrt{100^2 + 50^2} = 112 \text{ m}$$

$$r_E = \sqrt{100^2 + 100^2} = 141 \text{ m}$$

Since P is the same for all of the people, let

$$\frac{P}{4\pi} = \frac{I_S}{r_S^2} = \frac{I_H}{r_H^2} = \frac{I_E}{r_E^2}$$



and so,

$$\frac{I_{\rm H}}{I_{\rm S}} = \frac{r_{\rm S}^2}{r_{\rm H}^2} = \frac{100^2}{112^2} = 0.8$$

$$\frac{I_{\rm E}}{I_{\rm S}} = \frac{r_{\rm S}^2}{r_{\rm E}^2} = \frac{100^2}{141^2} = 0.5$$