BoxSand Energy and Intensity Quantitative Practice Problems

*Waves-Oscillations.Energy-Intensity***.QP.BS.1:** A source emits sound uniformly in all directions. There are no reflections of the sound. At a distance of 15 m from the source, the intensity of the sound is 4.3 X 10^{-3} W/m^2. What is the total sound power (*P*) emitted by the source?

*Waves-Oscillations.Energy-Intensity***.QP.BS.2:** At a distance of 6.2 m from a siren, the sound intensity is 4.7 X 10^{-3} W/m^2. Assuming that the siren radiates sound uniformly in all directions, find the total power radiated.

*Waves-Oscillations.Energy-Intensity***.QP.BS.3:** Suppose that a loud speaker emits sound uniformly in all directions and that there are no reflections. The intensity at a location 30 m away from the source is 3.4 X 10^{-5} W/m^2. What is the intensity at a spot that is 95 meters away?

*Waves-Oscillations.Energy-Intensity***.QP.BS.4:** A person stands at the midpoint between two speakers that are emitting amplified static hiss uniformly in all directions. The speakers are 45.0 m apart and the total power of the sound coming from each speaker is 0.65 W. Find the total sound intensity that the person hears **(a)** when they are at their initial position halfway between the speakers and **(b)** after they have walked 7.0 m directly toward one of the speakers.

*Waves-Oscillations.Energy-Intensity***.QP.BS.5:** A loudspeaker has a circular opening with a radius of 0.086 m. The electrical power needed to operate the speaker is 19.5 W. The average sound intensity at the opening is 14.2 W/m^2. What percentage of the electrical power is converted by the speaker into sound power?

*Waves-Oscillations.Energy-Intensity***.QP.BS.6:** Two sources of sound are located on the x axis, and each emits power uniformly in all directions. There are no reflections. One source is positioned at the origin and the other at x = +110 m. The source at the origin emits four times as much power as the other source. Where on the x axis are the two sounds equal in intensity? Note that there are two answers.