

93. The source being isotropic means $A_{\text{sphere}} = 4\pi r^2$ is used in the intensity definition $I = P/A$. Since intensity is proportional to the square of the amplitude (see Eq. 18-27), this further implies

$$\frac{I_2}{I_1} = \left(\frac{s_{m2}}{s_{m1}} \right)^2 = \frac{P/4\pi r_2^2}{P/4\pi r_1^2} = \left(\frac{r_1}{r_2} \right)^2$$

or $s_{m2}/s_{m1} = r_1/r_2$.

(a) With $I = P/4\pi r^2 = (10 \text{ W})/4\pi(3.0 \text{ m})^2 = 0.088 \text{ W/m}^2$.

(b) Using the notation A instead of s_m for the amplitude, we find

$$\frac{A_4}{A_3} = \frac{3.0 \text{ m}}{4.0 \text{ m}} \implies A_4 = \frac{3}{4}A_3 .$$