33. As in problem 31, we will change the words illuminance to intensity. Since the source is a point source, the radiation is isotropic. The logic is the same as for problem 25 above. Since we have a point source, the radiation from the source obeys the inverse square law. Since 80 cm is 8 times as far from the source as 10 cm, the intensity at 80 cm is $(1/8)^2$ the intensity at 10 cm. As a result,
    I (at 80 cm) = (2000 units)/64 = 31 units

34. Gamma rays source, point-size, has intensity *I* independent of distance, see Sec.25.14. Thus,
    the intensity at R = 20cm is the same at R = 60cm.

35. Once more, the magic word point source is used. This means the source is isotropic. The data tell us that the X-ray intensity at the unknown point P is 1% of the intensity at 5 cm. But 1% implies that the intensity at point P is 1/100 the intensity at 5 cm. We now set up the usual ratio.
    I(at point P)/I(at 5 cm) = 1/100 = $[(5 \text{ cm})/P]^2 \rightarrow P = 50$ cm.

41. This problem refers to Sec. 25.15.

    The lamp of intensity I_{60} = 60W givens an illuminance

$$E_{60} = \frac{I_{60}}{R_{60}^2}, R_{60} = 4\,ft$$

    A lamp of intensity I_{100} = 100W gives at distance above a table R_{100} an illuminance

$$E_{100} = I_{100} / R_{100}^2$$

    We want this to be

$$E_{100} = E_{60}, \text{ or}$$

$$\frac{I_{100}}{R_{60}^2} = 3\frac{I_{60}}{R_{60}^2}$$

$$\rightarrow \quad R_{100} = R_{60}\left(\frac{I_{100}}{3I_{60}}\right)^{1/2} = 2.98\,ft$$