1.15: A= π π B

There are several occasions in radiation theory in which one quantity is equal to π times another, the two quantities being related by an equation of the form $A = \pi B$. I can think of three, and they are all related to the three questions asked and answered in section 1.14.

If the source in question i of Section 1.14 is an element of a lambertian surface, then $I(\theta, \phi)$ is given by Equation 1.13.1, and in that case Equation 1.14.1 becomes

$$\phi = \pi I(0) \tag{1.15.1}$$

If the element δA in question ii is lambertian, L is independent of θ and f , and equation 1.14.3 becomes

$$M = \pi L \tag{1.15.2}$$

This, then is the very important relation between the exitance and the radiance of a lambertian surface. It is easy to remember which way round it is if you think of the units in which M and L are expressed and think of π as a solid angle.

If the hemisphere of question iii is uniformly lambertian (for example, if the sky is uniformly dull and cloudy) then L is the same everywhere in the sky, and the irradiance is

$$E = \pi L \tag{1.15.3}$$