1 Mass of a Slab

Determine the total mass of each of the slabs below.

(a) A square slab of side length L with thickness h, resting on a table top at $z = 0$, whose mass density is given by

$$\rho = A\pi \sin\left[\tfrac{\pi z}{h}\right].$$

(b) A square slab of side length L with thickness h, resting on a table top at $z = 0$, whose mass density is given by

$$\rho = 2A\Big[\Theta(z) - \Theta(z-h)\Big]$$

(c) An infinitesimally thin square sheet of side length L, resting on a table top at $z = 0$, whose surface density is given by $\sigma = 2Ah$.

(d) An infinitesimally thin square sheet of side length L, resting on a table top at $z = 0$, whose mass density is given by $\rho = 2Ah\,\delta(z)$.

(e) What are the dimensions of A?

(f) Write several sentences comparing your answers to the different cases above.