

### 1 Mass of a Slab

Determine the total mass of each of the slabs below.

- (a) (2pts) A square slab of side length  $L$  with thickness  $h$ , resting on a table top at  $z = 0$ , whose mass density is given by

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

- (b) (2pts) A square slab of side length  $L$  with thickness  $h$ , resting on a table top at  $z = 0$ , whose mass density is given by

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

- (c) (2pts) 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) (2pts) 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) (2pts) What are the dimensions of  $A$ ?

- (f) (2pts) Write several sentences comparing your answers to the different cases above.