4. [12 points] The density of the Earth changes with the distance below the surface of the Earth one goes. If x gives the distance (in km) below the surface, the density $\delta(x)$ (in kg/km^3) is approximately

x	0	1000	2000	2900	3000	4000	5000	6000	6370
$\delta(x)$	3300	4500	5100	5600	10,100	11,400	12,600	13,000	13,000

(the radius R of the Earth is about 6370 km). Let r measure the distance out from the center of the Earth.

a. [4 points] The integral $\int_0^{4000} (4\pi \cdot r^2 \cdot \delta(R-r))\, dr$ is the limit as $\Delta r \to 0$ of a Riemann sum $\sum 4\pi \cdot r^2 \cdot \delta(R-r) \cdot \Delta r$. In the context of this problem, what do the terms of this sum represent?

b. [4 points] Now consider the integral $\int_{R-4000}^{R} (4\pi \cdot r^2 \cdot \delta(R-r))\, dr$. Rewrite this in terms the variable x. Estimate your rewritten integral with MID(2).

c. [4 points] Let $F(x) = \int_{R-x}^{R} (4\pi \cdot r^2 \cdot \delta(R-r))\, dr$. Find $F'(x)$, showing work that shows how you obtained your answer.