9. [9 points] Consider the region $R$ bounded by the curves $y = x^2$, $y = x + 2$ and the y-axis, where $x$ and $y$ are measured in meters.

\begin{center}
\includegraphics[width=0.5\textwidth]{region.png}
\end{center}

a. [5 points] Let $T$ be the solid obtained by rotating the region $R$ about the $x$-axis. Find a formula involving definite integrals that computes the volume of $T$.

\[ V = \pi \int_a^b [f(x)^2 - g(x)^2] \, dx \]

Where $f(x)$ and $g(x)$ are the upper and lower bounds of the region $R$.

b. [2 points] The mass density of the solid $T$ is given by the function $\delta(x) = 2 - \sqrt{x}$ kg per m$^3$. Find a formula involving definite integrals that computes the mass of $T$.

\[ M = \int_a^b \delta(x) \, dx \]

Where $a$ and $b$ are the $x$-coordinates of the intersection points of the curves $y = x^2$ and $y = x + 2$.

c. [2 points] Find a formula involving definite integrals that computes the value of $\bar{x}$, the $x$ coordinate of the center of mass of the solid $T$.

\[ \bar{x} = \frac{1}{M} \int_a^b x \delta(x) \, dx \]