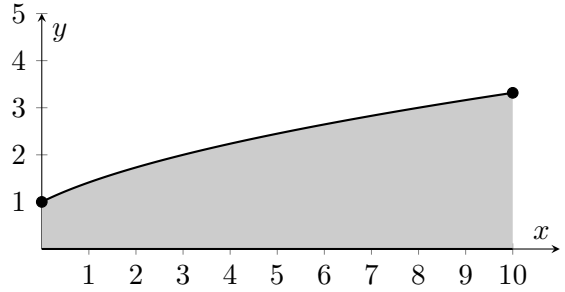
6. [10 points] Denise and Trystan are undersea research scientists, and they are preparing to descend into the ocean in a newly-constructed submarine. The submarine's shape is given by rotating the region below the curve $y = \sqrt{x+1}$, above the x-axis, and between $x = 0$ and $x = 10$ (see figure) about the x-axis. Here, x and y are measured in meters.

Graph of $y = \sqrt{x+1}$ from $x = 0$ to $x = 10$



The density of the submarine is not constant, due to the advanced materials used in its construction. Instead, the density $p(x)$ varies, and is given by $p(x) = (x-5)^2 + 1$ kg/m^3.

a. [5 points] Write an expression for the **volume** of a slice of the submarine at position x and of thickness Δx. Include units.

b. [2 points] Write an expression for the **mass** of the slice you found in part (a). Include units.

c. [3 points] Write, but do not evaluate, an integral which gives the **total mass** of the submarine. Include units.