10. [8 points] The graph of part of a function \( g(x) \) is pictured below.

![Graph of function g(x)](image)

a. [4 points] A thumbtack has the shape of the solid obtained by rotating the region bounded by \( y = g(x) \), the \( x \)-axis and \( y \)-axis, about the \( y \)-axis. Find an expression involving integrals that gives the volume of the thumbtack. Do not evaluate any integrals.

\[
\text{Solution:} \quad \text{Using the cylindrical shell method, the volume of the thumbtack is } \int_0^7 2\pi x g(x) \, dx.
\]

b. [4 points] A door knob has the shape of the solid obtained by rotating the region bounded by \( y = g(x) \), the \( x \)-axis and \( y \)-axis, about the \( x \)-axis. Find an expression involving integrals that gives the volume of the door knob. Do not evaluate any integrals.

\[
\text{Solution:} \quad \text{Using the washer method, the volume of the door knob is } \int_0^7 \pi (g(x))^2 \, dx.
\]