Shell Method - Finding Volume of Solid of Revolution

Consider region $R$ between the $x$-axis and the graph of $y = f(x)$ on the interval $[a, b]$.

Create a solid of revolution by revolving region $R$ about the $y$-axis.
Now form a cylindrical shell at $x$ of height $h = f(x)$, thickness $dx$, and circumference $2\pi r = 2\pi x$. 
The volume of the cylindrical shell is approximately 
\( (2\pi x) \cdot f(x) \cdot dx \),

and the total volume of the solid is

\[
Volume = 2\pi \int_a^b x \cdot f(x) \, dx
\]

radius \( r \)  \( \uparrow \)
\( \downarrow \)
height \( h \)