6.6: Surface Area

Learning Objectives. Upon successful completion of Section 6.6, you will be able to...

- Answer conceptual questions involving surface area.
- Find surface areas of curves revolved about the x-axis.
- Find surface areas of curves revolved around the y-axis.

Finding a Formula for the Area of a Surface of Revolution

Goal: To find the **area of the surface** generated when a curve ($y = f(x)$, $a \leq x \leq b$ or $x = g(y)$, $c \leq y \leq d$) is rotated about the x-axis or the y-axis.

So, for $f > 0$ with f' continuous on $[a, b]$, the **surface area** of the surface obtained by rotating $y = f(x)$, $a \leq x \leq b$ about the x-axis is...

✍ **Example.** Find the area of the surface generated by rotating $y = \sqrt{1 + e^x}$ for $0 \leq x \leq 1$ about the x-axis.

✍ **Example.** Find the area of the surface generated by rotating $y = (3x)^{1/3}$ for $0 \leq x \leq \dfrac{8}{3}$ about the y-axis.