

Chapters 8.1 & 8.2: Volumes and Arc Lengths

Calculus II

Spring 2021

College of the Atlantic

1. Find the volume of the solid obtained by rotating the region bounded by $y = x^2$ and $x = 2$ around the x -axis.
2. Find the volume of the solid obtained by rotating the region bounded by $y = x^2$, $x = 2$, and $y = 0$ around the y -axis.
3. The region bounded by the curves $y = x$ and $y = x^2$ is rotated about the line $y = 3$. What is the volume of the resulting solid?
4. A hemispherical bowl of radius 12 inches is filled to a depth of 3 inches. Find the volume of water in the bowl.
5. A hemispherical bowl of radius r is filled to a depth of h . Find a formula for the formula of the volume of the water. Check your formula by examining what happens when $h \rightarrow r$.
6. Use the arc length formula to calculate the arc length of $f(x) = 1 + 3x$ from $x = 1$ to $x = 2$. Explain why your answer is comforting. It's probably easiest if you resist the urge to convert any square roots you might encounter into decimals.
7. Let $f(x) = x^2$. How long is the curve from $x = 0$ to $x = 1$?
8. Let $f(x) = x^3$. How long is the curve from $x = 0$ to $x = 1$?
9. Let $f(x) = \sin(x)$. How long is the curve from $x = 0$ to $x = \pi$?