

TI-84+ Lab 4 For Mathematics 224

Topics: volume of a solid of revolution, average value

Volume of a Solid of Revolution. Volume of solid of revolution of $f(x) = \sqrt{x}$, $[0, 9]$.

$$\begin{aligned}\int_a^b \pi[f(x)]^2 dx &= \int_0^9 \pi[\sqrt{x}]^2 dx \\ &= \int_0^9 \pi[x] dx \\ &= \int_0^9 [\pi x] dx \\ &= \left[\frac{\pi}{2} x^2 \right]_0^9 \\ &= \frac{\pi}{2}(9)^2 - \frac{\pi}{2}(0)^2 = \frac{18}{2}\pi\end{aligned}$$

Average Value. Find average value of $f(x) = e^{3x}$ over $[1, 3]$.

$$\begin{aligned}\frac{1}{b-a} \int_a^b f(x) dx &= \frac{1}{3-1} \int_1^3 (e^{3x}) dx \\ &= \frac{1}{2} \left[\frac{1}{3} e^{3x} \right]_{x=1}^{x=3} \approx 1347.17\end{aligned}$$