

Review Exercises from Math 104

1. Find the area enclosed by the graphs of $y = x$ and $y = x^2$.
2. The area enclosed by the graphs of $y = x$ and $y = x^2$ is rotated around the x -axis. Find the volume of the resulting solid.
3. Find the derivative of $f(x) = \sin(e^x) + e^{\sin x}$.
4. Evaluate the integral: $\int_0^{\ln 3} \frac{e^x}{e^x + 1} dx$
5. Evaluate the integral: $\int x \cos 5x dx$
6. Find the arc length of the graph $y = \ln(\sec x)$ from $x = 0$ to $x = \frac{\pi}{4}$.
7. A curve is given by the parametric equations $x = e^{\sqrt{t}}$ and $y = t - \ln t^2$. Find the equation of the tangent line at the point corresponding to $t = 1$.
8. Do the following series converge or diverge? How do you know?

(a) $\sum_{n=1}^{\infty} \frac{5}{2n^2 + 3}$

(b) $\sum_{n=1}^{\infty} (-1)^n \frac{n^3}{3^n}$