

Review Exercises

1. Find the derivative of $f(x) = \sin(e^x) + e^{\sin x}$.
2. Find the power series for $f(x) = \frac{x}{1 + 9x^2}$ and its radius of convergence.
3. Find the Maclaurin series for $f(x) = \sin(2x)$.
4. Evaluate the integral: $\int_0^1 \frac{x - 1}{x^2 + 3x + 2} dx$.
5. Estimate $e^{-0.2}$ correct to three decimal places. (Hint: use a Taylor series for e^x .)
6. Find the Maclaurin series for $f(x) = \sin^2 x$.
7. Mentally estimate 3^{10} . Do not write down any computation; do not use a calculator.
8. Solve the initial value problem: $t \frac{dy}{dt} + 2y = t^3$, $t > 0$, $y(1) = 0$
9. Find the volume above the cone $z = \sqrt{x^2 + y^2}$ and below the hemisphere $z = \sqrt{1 - x^2 - y^2}$.
10. Find the volume of the tetrahedron bounded by the planes $x + 2y + z = 2$, $x = 2y$, $x = 0$, and $z = 0$.