

Final Practice Problems

1. $\int \frac{x^3}{\sqrt{x^2+9}} dx$
2. $\int (\sin x + x)e^x dx$
3. $\int_{-\infty}^{\infty} \frac{dx}{25+4x^2}$
4. Solve $\frac{dy}{dx} = xe^{x^2-\ln(y^2)}$ if $y(0) = 1$.
5. *Set up a differential equation for the following problem.* A 1500 gallon tank contains 600 gallons of water with 5 pounds of salt dissolved in it. Water enters the tank at a rate of 9 gallons per hour, and the water entering the tank contains $\frac{1}{2}$ lb of salt per gallon. A well-mixed solution leaves the tank at a rate of 6 gallons per hour. How much salt is in the tank when it overflows?
6. Find the Taylor series centered at 0 of $f(x) = \ln(1+x^2)$. For what values of x does the series converge to $f(x)$?
7. Find all values of x for which $\sum_{n=0}^{\infty} \frac{(-1)^n(x-2)^n}{3^n}$ converges.
8. Consider the three points $A(0, 2, 5)$, $B(1, -3, 0)$ and $C(0, -2, 1)$.
 - (a) Write an equation for the plane that passes through A , B , and C .
 - (b) Find the distance from the plane to the origin.