

Practice problems for Exam 2

I. Evaluate the indefinite integrals

1. $\int 3xe^{-x^2} dx$

2. $\int \frac{\cos x}{1 + \sin^2 x} dx$

3. $\int \frac{1}{(x-1)(x+2)} dx$

4. $\int \sqrt{e^x} dx$

5. $\int \frac{(x+1)^2}{x-1} dx$

6. $\int x \sin x dx$

7. $\int x \sec^2 3x^2 dx$

II. Evaluate the given definite integrals

8. $\int_0^{\pi/2} x \sin x dx$

9. $\int_0^2 \frac{1}{x-2} dx$

10. $\int_0^2 \frac{1}{x^2+4} dx$

11. $\int_1^2 \ln x dx$

12. $\int_0^1 \frac{1}{\sqrt{x}} dx$

13. $\int_0^1 \frac{1}{x^2} dx$

14. $\int_1^{\infty} \frac{1}{\sqrt{x}} dx$

15. $\int_1^{\infty} \frac{1}{x^2} dx$

III. Taylor Polynomials

16. Find the Taylor polynomial of degree $n = 3$ about $x = 0$ for $f(x) = \sin(2x)$.

17. Find the Taylor polynomial of degree $n = 4$ about $x = 3$ for $f(x) = \frac{1}{x-2}$.

18. Determine the degree of the Taylor polynomial for $f(x) = e^x$ at $a = 0$ that would estimate $f(x)$ for $x \in [0, 3]$ with an error less than 10^{-3} .