

1. Find $f'(x)$:

(a) $f(x) = \log_5(x^3 + e^x)$

(b) $f(x) = (x + 3)^{x+4}$

2. Evaluate the integrals.

(a) $\int \sec x \tan x dx$

(b) $\int x^\pi dx$

(c) $\int \frac{1}{x} dx$

(d) $\int \csc^2 x dx$

(e) $\int \cot x dx$

(f) $\int e^x dx$

(g) $\int \frac{1}{\sqrt[3]{x}} dx$

(h) $\int (x - 4)^3 dx$

(i) $\int e dx$

(j) $\int \sec x dx$

3. Evaluate $\int_0^{10} \frac{x+5}{x} dx$.

4. Evaluate $\int 4^x dx$.

Hint: What is the derivative of $f(x) = 4^x$?

5. Consider the region R bounded above by $y = e^5$, below by $y = e^x$, and on the left by $x = 1$.

(a) *Set up* an integral or integrals for the area of R .

(b) *Set up* an integral or integrals for the volume of the region obtained by revolving R about the y -axis.

6. Evaluate $\int \frac{8x+8}{x(x+2)^2} dx$.

7. Consider the probability density function $f(x) = \frac{3}{x^4}$ for $1 \leq x < \infty$.

(a) Compute the expected value of x .

(b) Compute the variance of x .

8. Evaluate $\int_{-3}^3 \sqrt{9-x^2} dx$.

Hint: Sketch $y = \sqrt{9-x^2}$.

9. Evaluate $\int_{-4}^0 x^3 \sqrt{16-x^2} dx$. You may use the fact that $\int_0^4 x^3 \sqrt{16-x^2} dx = \frac{2048}{15}$.

10. Evaluate the integrals:

(a) $\int \frac{5 \sec^2 x}{2 + 3 \tan x} dx$

(b) $\int \frac{\tan(x^{\frac{1}{4}} + 3)}{x^{\frac{3}{4}}} dx$

11. Evaluate $\int \sqrt{5 + \sqrt{x}} dx$.

12. Evaluate $\int_0^{10} \frac{1}{\sqrt[3]{x-4}} dx$.

13. Evaluate the integrals:

(a) $\int_2^4 (x^2 + 3)e^x dx$

(b) $\int (x+3) \sin x dx$

14. *Set up* an integral for the average value of $f(x) = x^2$ from $x = 0$ to $x = 10$.

15. (a) What is integration and (b) what is it good for? Explain in your own words so that someone who just finished Math 16A could understand. If you use any words we learned in this class (e.g., “antiderivative”), you should explain those as well.