

MAC2312
MORE suggested problems on Chapter 7 material
(techniques of integration)

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1. Evaluate the integral.

$$\int \frac{1}{x^2 - 3x - 4} dx$$

2. Evaluate the integral.

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

3. Evaluate the integral.

$$\int \frac{x^2 - 8}{x + 3} dx$$

4. Evaluate the integral.

$$\int \frac{2x^2 - 1}{(4x - 1)(x^2 + 1)} dx$$

5. Evaluate the integral by making a substitution that converts the integrand to a rational function.

$$\int \frac{\cos \theta}{\sin^2 \theta + 4 \sin \theta - 5} d\theta$$

6. Use both the Trapezoid Rule and Simpson's Rule with $n = 4$ to estimate the definite integral.

$$\int_0^4 \frac{1}{x^3 + 1} dx$$

7. Use the Trapezoid Rule and Simpson's Rule to estimate the integral, using $n = 2$ subintervals.

$$\int_1^{49} \frac{1}{\sqrt{x+1}} dx$$

Can you also evaluate the integral exactly?

8. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_3^{\infty} \frac{2}{x^2 - 1} dx$$

9. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_e^{\infty} \frac{1}{x \ln^3 x} dx$$

10. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_0^4 \frac{1}{(x-4)^2} dx$$

11. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_0^{\pi/2} \tan x \, dx$$

12. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_0^4 \frac{1}{\sqrt{4-x}} dx$$

13. Determine whether the integral converges or diverges, and find its value if it converges.

$$\int_0^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$$