Integration Strategy

Evaluate each of the following integrals. You may use any method from Calculus I or Calculus II to do these integrals.

1. $\int \frac{\tan^6(4w)}{\cos^4(4w)}\,dw$

2. $\int (x+\cos(x))^2\,dx$

3. $\int \frac{\sec^2(t)\tan(t)}{\sec^2(t)-\sec(t)-12}\,dt$

4. $\int (1+z)\sqrt{4+z^2}\,dz$

5. $\int x^{23}\mathbf{e}^{1+x^{12}}\,dx$

Improper Integrals

Determine if each of the following integrals are convergent or divergent. Evaluate the integral if it is convergent.

6. $\int_{-\infty}^{\infty} x^3\mathbf{e}^{-x^2}\,dx$

7. $\int_{-3}^{1} \frac{6}{z^2-4z-12}\,dz$

8. $\int_{0}^{\infty} y^3\ln\left(\frac{1}{y}\right)dy$

Comparison Test for Improper Integrals

Use the Comparison Test to determine if the integral converges or diverges. Do not find the value of the integral if it converges.

9. $\int_{1}^{\infty} \frac{x^4+\sin^4(4x)}{x^5\cos^2(2-x)}\,dx$

Continued on Back $\Rightarrow$

10. $\int_{10}^{\infty} \frac{(x-6)^3}{x^8 + 4\mathbf{e}^{-x}}\,dx$

Approximating Definite Integrals

11. Use the MidPoint Rule, Trapezoid Rule, and Simpson's Rule with $n = 4$ to approximate the value of,

$$\int_{-1}^{1} \ln\left(1 + \mathbf{e}^{\cos(x)}\right) dx$$