Integration Strategy

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

1. $\int \cos^4(4t)\sin^3(8t)\,dt$ Hint : You'll need to make sure that the trig function arguments are the same…

2. $\int \left(2z + \mathbf{e}^{4z}\right)^2 dz$

3. $\int \dfrac{\left[\ln(2x)\right]^2}{x\left(\left[\ln(2x)\right]^2 + 2\ln(2x) - 15\right)}\,dx$

4. $\int y^7\sqrt{25+4y^4}\,dy$

5. $\int t^{15}\mathbf{e}^{1-t^8}\,dt$

Improper Integrals

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

6. $\int_{-\infty}^{\infty} x\mathbf{e}^{x^2+1}\,dx$

7. $\int_0^3 \dfrac{x+1}{x^2-4}\,dx$

8. $\int_0^{\infty} x^2\ln(2x)\,dx$

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. $\int_1^{\infty} \dfrac{x\mathbf{e}^{-x} - \sin^2(x)}{x^4}\,dx$

Continued on Back $\Rightarrow$

10. $\int_2^{\infty} \frac{x+1}{x^2-\ln(x)}\,dx$ Hint : Try graphing $f(x)=x$ and $f(x)=\ln(x)$ on the same graph to get a nice relationship between the two functions. Then think about how *x* and x^2 are related on the interval we're working on.

Approximating Definite Integrals

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

$$\int_4^6 \frac{\cos x}{x}\,dx$$