

Homework 7 - Integration Techniques

Work,

Burden-Faires: 4.4.2(a,c), 4(a,c), 6(a,c), 12

Burden-Faires: 4.5.2(c)

Burden-Faires: 4.6.3(b), 6(a)

Burden-Faires: 4.7.1(b,g), 2(b,g), 3(b,g), 4(b,g)

Burden-Faires: 4.8.1(a,c), 2(a,c), 5(a,c), 6(a,c)

Burden-Faires: 4.9.2(a), 3(c)

Part 2. Integration. Calculate each of the following integrals to 5 significant digits. Graph the integrand over the interval of integration. Describe the method you used and give a reason for the technique chosen. Provide a copy of the program you used for these computations.

A. $\int_0^\infty e^{-t^4} dt$

B. $\int_0^{2\pi} \frac{\sin(t)}{t} dt$

C. $\int_0^5 \sin(t^4) dt$

Part 3. Application. The logarithmic integral function $Li(x)$ is used in number theory to estimate the number of primes less than x .

$$Li(x) = \int_2^x \frac{dt}{\ln(t)}$$

Graph this function over the interval $[10^1, 10^8]$ using a loglog scale.