

Worksheet 3

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I. Evaluate the following integrals

1. $\int \frac{\ln(x-1)}{x\sqrt{x}} dx$

2. $\int \frac{1}{1+2e^x - e^{-x}} dx$

3. $\int \frac{x + \arcsin x}{\sqrt{1-x^2}} dx$

II. Use your favorite approximation method to approximate $\int_0^4 x^3 dx$ (use $n = 4$ intervals). Evaluate the errors and compare them to the theoretical error bounds.

III. Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

1. $\int_1^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx.$

2. $\int_{-\infty}^{\infty} \cos(\pi t) dt.$

3. $\int_0^{\infty} \frac{dz}{z^2 + 3z + 2}.$