

FALL 2019 QUIZ 3

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The problems that follow illustrate the methods covered in class. They are typical of the types of problems that will be on the tests.

Problem 1. Determine the Romberg estimate of the integral for $n = 7$.

$$\int_{-4}^4 \frac{1}{1+x^2} dx.$$

How many subdivisions of the interval $[-4, 4]$ does this represent? How many function evaluations are necessary in the calculation?

Problem 2. Determine the Romberg estimate of the above integral for $n = 5$. How many subdivisions of $[-4, 4]$ does this represent? How many function evaluations are necessary?

Problem 3. Explain the Romberg method for approximating the integral. If the interval is divided into 2^n subintervals and the Romberg method is applied, what is the error of the method? In calculating a particular integral using Romberg integration, how do you conclude what the best estimate is in the printout? How do you conclude what the error is from the printout?