MATH 242 - HW6

due: 02/28/2024

1. Compute the following definite integral accurate to 6 decimal places:

$$\int_1^3 7\sqrt{2x+3}\,dx$$

2. Approximate (include 6 decimal places) the integral by computing S_4 (by using Simpson's Rule with $n = 4$).

3. Using the last two problems, what is the magnitude of the absolute error $|E_{S_4}| = |\int_1^3 7\sqrt{2x+3}dx - S_4|$?

4. What is the upper bound of $|E_{S_4}|$ applied to this particular $n = 4$, $a = 1$, $b = 3$, and $f(x) = 7\sqrt{2x+3}$? Comment on how this compares to what you found in the last question.

5. Suppose that you would have liked to estimate the previous integral to an accuracy having an Error of $|E| < 10^{-6}$. How large would you need to choose n for...

   (a) Simpson's Rule?

   (b) the Trapezoid Rule?

   (c) Mid-point Rule?