

Calculus II Lab 2

1. Use Mathematica's `Sum` command to calculate the following.
 - (a) $\sum_{i=1}^3 i^2$.
 - (b) $\sum_{i=1}^{1000} i^2$.
 - (c) $\sum_{i=1}^n i^2$.
2. Use Mathematica to estimate $\int_{10}^{28} \sqrt{x} \, dx$ using the following methods with $n = 6$ subintervals.
 - (a) Left endpoint approximation
 - (b) Right endpoint approximation
 - (c) Trapezoidal approximation
 - (d) Midpoint approximation
 - (e) Simpson's rule.
3. Write a Mathematica function called `LEA` that accepts as inputs a function f and real numbers a , b , and n , and returns the left endpoint approximation for $\int_a^b f(x) \, dx$ using n subintervals. Use this function to compute the answer to problem (2a).
4. Write Mathematica functions `REA`, `TA`, and `MPA` that are similar to `LEA` but compute the right endpoint, trapezoidal, and midpoint approximations. Use these functions to check your answers for problems (2b), (2c), and (2d).
5. **Bonus.** Write the function `SA` corresponding to Simpson's approximation. The following identity should be helpful

$$S_{2n} = \frac{1}{3}T_n + \frac{2}{3}M_n.$$

Use this function to compute the answer to problem (2e).

You may use Mathematica, including the functions developed in this lab, to do your section 7.7 homework.