

TI Lab 5: Approximating Integrals with Sums

IN THIS LAB, YOU WILL: APPROXIMATE A DEFINITE INTEGRAL USING A RIEMANN SUM PROGRAM.

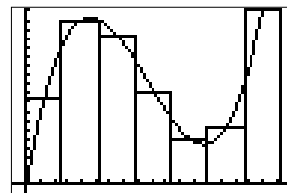
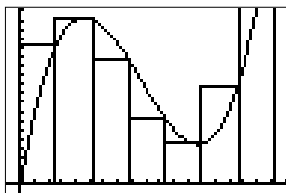
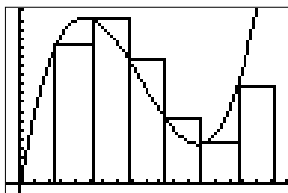
1. Now that you have learned how to approximate a definite integral using a Riemann Sum, it's time you learned how to do this on your calculator by using the program RIEMANN. The first screen you see upon running the program is the one below on the left. Not only can you calculate left- and right-hand sums, you can also calculate midpoint sums and sums of trapezoids that approximate the area. To use this program, you **must always** choose option 1:SET PARAMETERS. This is where you enter the function and set upper and lower bounds.

- a) Run the program. Enter $x^3 - 10x^2 + 26x$, lower bound 0, upper bound 7, and 7 partitions.

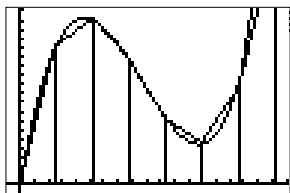
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RIEMANN SUM
1:SET PARAMETERS
2:LEFT SUM
3:RIGHT SUM
4:MIDPOINT SUM
5:TRAPEZOID SUM
6:DEF. INTEGRAL
7:QUIT
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FUNCTION:
X^3-10X^2+26X
LOWER BOUND:0
UPPER BOUND:7
PARTITIONS:7
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- b) When you select one of the sums, the program graphs the function over the interval $[lower, upper]$ and draws the appropriate rectangles. Find the left-hand sum, right-hand sum, and midpoint approximations for the function in part (a).



- c) Next, select the trapezoid approximation. You will learn more about approximating a definite integral with trapezoids in the next Calculus Lab. Finally, select the definite integral. This option is here so you can immediately compare the more exact value with the various approximations.



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DEF. INTEGRAL:
93.91666667
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2. Find the left-hand, right-hand, midpoint, and trapezoid sum approximations for the function

$$e^{-x} \ln(x+2) - x + x^2 - \frac{1}{5}x^3$$

over the interval $[0, 6]$. Use 6 partitions.

3. Repeat problem 2 with 12 partitions.