MATH 135 – Calculus 1
Practice on Approximating Areas
December 9, 2019

Background

We have discussed the idea of approximating the area between a graph $y = f(x) \geq 0$ and the x-axis for $a \leq b \leq x$ by using sums of areas of rectangles and worked out a first example. To practice using these ideas you will work through another similar example using a different function, interval, and subdivision. Here's the description of the region we want in formulas: The region between $y = x^2 - 4x + 6$ and the x-axis, for $1 \leq x \leq 2$.

Assignment: One of the final formal assignments for the semester will be to write up answers to the following questions individually. The score will be counted as the Part B for Problem Set 9. (Note: There will also be a short Webassign Problem Set 9, part A due on Friday on some of this material.) *Due:* Friday, December 13.

Questions

1. Sketch the region (you may want to complete the square in $x^2 - 4x + 6$ to do this).
2. To subdivide the x-interval $[1, 2]$ into $N = 5$ equal smaller intervals, what Δx should we use? What are the endpoints $x_0, x_1, x_2, x_3, x_4, x_5$ of the intervals?
3. Make rectangles using the value of the function at the *left endpoint* of each smaller interval to get the heights. Sketch these rectangles together with the graph.
4. Write the sum giving the areas of these rectangles using summation notation, and compute the numerical value.
5. Now make rectangles using the value of the function at the *right endpoint* of each smaller interval to get the heights. Sketch these rectangles together with the graph.
6. Write the sum giving the areas of these rectangles using summation notation, and compute the numerical value.
7. What can you say about the area of the region from your computations?