

### Section 4.3 Homework

**FOLLOW THE INSTRUCTIONS I AM GIVING WITH THE PROBLEMS.**

**My instructions may be different for some problems from the instructions given in the textbook.**

**1 part b, 2 part a, 3 part b, 4 part b**

**5** Use  $n = 16$  rectangles and **ONLY** find the Riemann sums using **RIGHT** endpoints for this problem. Use the summation evaluation formulas from section 4.2.

**7, 9** Use  $n = 6$  rectangles and do right and left endpoints (but not midpoints) There is not a summation formula to use for these problems, so if you use the number of rectangles as instructed by the book you will be doing a lot more calculation work than if you use  $n = 6$ . Show your work in setting up the Riemann sums, showing the evaluation points, the function value, and writing out the sum, as well as evaluating it.

*On a quiz or exam, I will place more importance on seeing the correct work with all the detail needed to set it up than on just obtaining the correct numerical answer for the sum.*

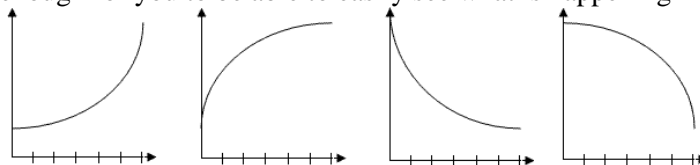
**13** For  $n = 20, 100, 200, 500$  first find the sums for left endpoints, then for right endpoints, then midpoints using an online Riemann sum calculator at <http://mathworld.wolfram.com/RiemannSum.html> or at [http://www.math.ucla.edu/~ronmiech/Java\\_Applets/Riemann/](http://www.math.ucla.edu/~ronmiech/Java_Applets/Riemann/) Observe to see the sums appear to be approaching the same limit as  $n$  gets large.

Do NOT calculate by hand or using the summation formula; this is a TECHNOLOGY problem!  
It's very fast using the online sum calculator.

**15, 16, 18** Use the summation evaluation formulas from section 4.2 and take limit as  $n \rightarrow \infty$

**19, 22** Graph it first and connect the points with a smooth curve to see what it looks like. Then evaluate it numerically from the given data. In the real world we don't always have a formula for a function; sometimes we need to estimate area under the curve from data.

**23, 24, 25, 26:** Use graphs such as those below to draw the rectangles for left endpoints, right endpoints, and midpoints. Hint: Use only a few rectangles so that they will be large enough for you to be able to easily see what is happening in each situation.



**29, 30**

**Additional Problem (#A1):** Approximate the area under the curve  $y = 20x$ , on the interval  $[1,3]$  using  $n = 10$  approximating rectangles, using the summation evaluation formulas. You can do this using left endpoints and using right endpoints. I suggest that you use right endpoints first, then use left endpoints. It is easier to set up for right endpoints than for left endpoints. Do not do midpoints. The answer for right endpoints is 84; the answer for left endpoints is 76