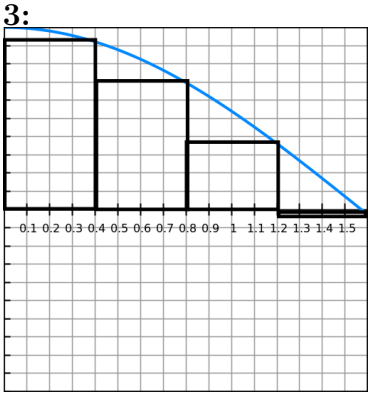
5.1: 1, 3, 5, 11, 12, 13, 15, 17, 19

5.2: 1, 3, 5, 7, 9, 10, 12, 17, 19, 22, 31, 32, 35, 39, 31, 43

Chapter 5.1

1:
4 rectangles:
Lower estimate: left to right rectangles:
Heights: $2, 2.75, 5, 5.75$
Area: $2 * 2 + 2.75 * 2 + 5 * 2 + 5.75 * 2 = 31$
Upper estimate: right to left rectangles
Heights: $8, 5.75, 5, 2.75$
Area: $2 * 8 + 2 * 5.75 + 2 * 5 + 2 * 2.75 = 43$
8: Lower: Heights: $2, 3, 3.75, 4.5, 5, 5.75, 5.5, 5.9, 6$
Area: 41.4
Upper: Heights: $6, 5.9, 5.5, 5.75, 5, 4.5, 3.75, 3$
Area: 45.4

3:



a: Area $= 0.55$
b: Area $= 1.55$

5:
$f(x) = 1 + x^2, [-1, 2]$
a: $\Delta x \sum_{j=1}^{N} f(a + j\Delta x) = 8$

b: $\Delta x \sum_{j=0}^{N-1} f(a + j\Delta x) = 5$
c: $\Delta x \sum_{j=1}^{N} f(a + (j - \frac{1}{2})\Delta x) = 5.75$
Midpoint (c) seems to be the most accurate.

11:
Lower: 11.5667
Upper: 14.9333

12:
a. 25.8
b. 25.2
c. Yes. The second is the upper estimate and the first the lower.

13:
Lower: 7
Upper: 6.32

15:
Left endpoint: $\frac{70}{6} + \frac{50}{6} + \frac{35}{6} + \frac{25}{6} + \frac{15}{6} + \frac{10}{6} = 34.1667$
Right endpoint: $\frac{50}{6} + \frac{35}{6} + \frac{25}{6} + \frac{15}{6} + \frac{10}{6} + \frac{0}{6} = 22.5$
Avg: 28.333

17:
$\Delta x = \frac{3-1}{N} = \frac{2}{N}$
$f(x) = \frac{2x}{x^2+1}$
$\lim_{N\to\infty} \Delta x \sum_{j=1}^{N} f(1 + j\Delta x)$

19:
$\Delta x = \frac{0-\pi/2}{N} = \frac{-\pi/2}{N}$
$f(x) = x \cdot \cos(x)$
$\lim_{N\to\infty} \Delta x \sum_{j=1}^{N} f(1 + j\Delta x)$

Chapter 5.2

/*

5.2: 1, 3, 5, 7, 9, 10, 12, 17, 19, 22, 31, 32, 35, 39, 31, 43

1:
$f(x) = 3 - \frac{x}{2}$
$N = 6\ \Delta x = \frac{b-a}{N} = \frac{12}{6} = 2$
$\Delta x \sum_{i=1}^{N} f(2 + i\Delta x)$
$\Delta x \sum_{i=1}^{N} f(2 + 2i)$
$2 \sum_{i=1}^{6} (3 - (1 + i))$
$= -18$
The Riemann sum represents the sum of the rectangles below the line of $f(x)$.

3:
$a = 0, b = 2, N = 4, f(x) = e^x - 2$
$\Delta x = \frac{2}{4} = \frac{1}{2}$
$\frac{1}{2} \sum_{i=1}^{N} (e^{\frac{i}{2} - \frac{1}{4}} - 2)$