Homework 13

§5.1#3, 5, 13, 19, 27, **8**, **16**, **24**

§5.2#3, 19, 27*, 29, 37, **12**, **32**, **36**

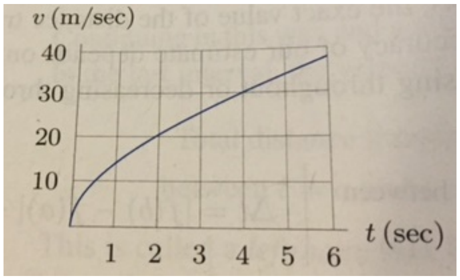
§5.1 #3. The velocity function $v(t)$ given in the table is decreasing. Using $n = 5$ subdivisions to approximate the total distance traveled between $t = 2$ and $t = 12$, find

a) An upper estimate

b) A lower estimate

t	2	4	6	8	10	12
$v(t)$	44	42	41	40	37	35

§5.1 #5. The graph shows the velocity, v, in m/s of an object. Estimate the total distance the object traveled between $t = 0$ and $t = 6$.



§5.1 #13.

t	15	17	19	21	23
$f(t)$	10	13	18	20	30

a) If $n = 4$, what is Δt? What are $t_0,\ t_1,\ t_2,\ t_3,\ t_4$? What are $f(t_0),\ f(t_1),\ f(t_2),\ f(t_3),\ f(t_4)$?

b) Find the left and right sums using $n = 4$.

c) If $n = 2$, what is Δt? What are $t_0,\ t_1,\ t_2$? What are $f(t_0),\ f(t_1),\ f(t_2)$?

d) Find the left and right sums using $n = 2$.

§5.1 #19. Find the difference between the upper and lower estimates of the distance traveled at velocity

$f(t) = \sin(t)$ on the interval $0 \le t \le \pi/2$ for 100 subdivisions.

§5.1 #27. A car initially going 50 ft/sec brakes at a constant rate (constant negative acceleration), coming to a stop in 5 seconds.

a) Graph the velocity from $t = 0$ to $t = 5$

b) How far does the car travel?

c) How far does the car travel if its initial velocity is doubled, but it brakes at the same constant rate?

§5.1 #**8**. For time t in hours, a bug is crawling at a velocity, v, measured in meters/hour given by $v = \frac{1}{1+t}$. Use $\Delta t = 0.2$ to estimate the distance that the bug crawls during the first hour. Find an overestimate and an underestimate. Then average the two to get a new estimate.

§5.1 #**16**. The velocity of a particle moving along the x-axis is given by $f(t) = 6 - 2t$ cm/sec. Use a graph of $f(t)$ to find the exact change in position of the particle from time $t = 0$ to $t = 4$ seconds.

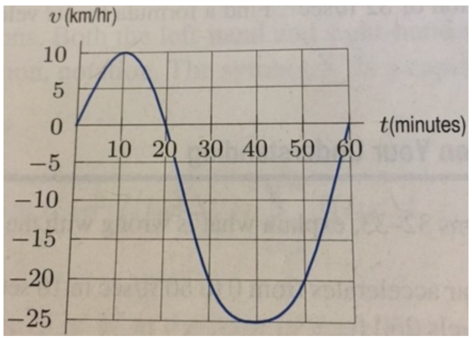
§5.1 #**24**. A bicyclist is pedaling along a straight road for one hour with a velocity v shown in the graph below. She starts out five kilometers from the lake and positive velocities take her toward the lake.

a) Does the cyclist ever turn around? If so, at what time(s)?

b) When is she going fastest? How fast is she going then? Toward the lake or away?

c) When is she closest to the lake? Approximately how close to the lake does she get?

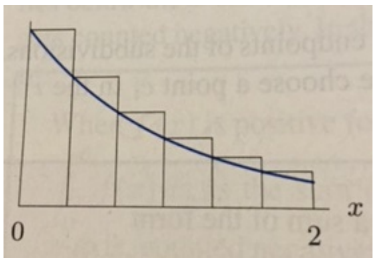
d) When is she farthest from the lake? Approximately how far from the lake is she then?



§5.2 #3. The graph shows a Riemann sum approximation with n subdivisions to $\int_a^b f(x)dx$.

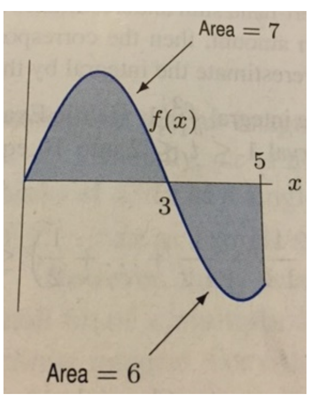
a) Is it a left- or right-hand approximation? Would the other one be larger or smaller?

b) What are $a,\ b,\ n,\ \Delta x$?



§5.2 #19. a) What is the area between the graph of $f(x)$ and the x-axis between $x = 0$ and $x = 5$?

b) What is $\int_0^5 f(x)dx$?



§5.2 #27*. Express the area under the curve $y = 7 - x^2$ and above the x-axis using integrals. Then estimate the area using a calculator.

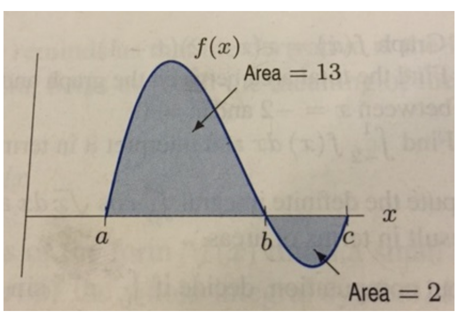
§5.2 #29. Use the graph to find the values of

a) $\int_a^b f(x)dx$

b) $\int_b^c f(x)dx$

c) $\int_a^c f(x)dx$

d) $\int_a^c |f(x)|dx$



§5.2 #37. a) On a sketch of $y = \ln(x)$, represent the left Riemann sum with $n = 2$ subdivisions approximating $\int_1^2 \ln(x)dx$. Write out the terms in the sum, but do not evaluate it.

b) On another sketch, represent the right Riemann summ with $n = 2$ approximating $\int_1^2 \ln(x)dx$. Write out the terms in the sum, but do not evaluate it.

c) Which sum is an overestimate? Which sum is an underestimate?

§5.2 #**12**. Use the table to estimate $\int_0^{12} f(x)dx$:

x	0	3	6	9	12
$f(x)$	32	22	15	11	9

§5.2 #**32**. Use the graph to find the values:

a) $\int_0^2 f(x)dx$ b) $\int_3^7 f(x)dx$ c) $\int_2^7 f(x)dx$ d) $\int_5^8 f(x)dx$

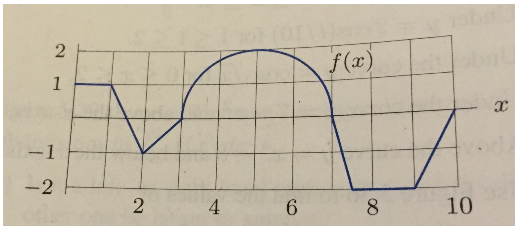


Figure 5.39: Graph consists of a semicircle and line segments

§5.2 #**36**. Estimate $\int_0^1 e^{-x^2}dx$ using $n = 5$ rectangles to form a

a) Left-hand sum

b) Right-hand sum