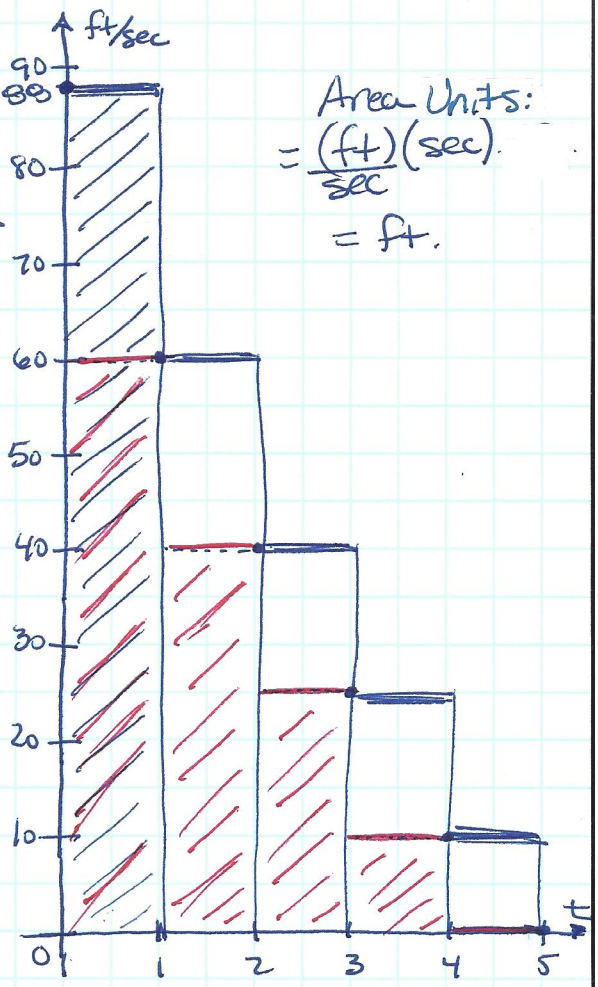
Ch 5.1
P. 277 #1, 4, 6, 22 MEASURE DISTANCE TRAVELED DAY 84 (A)

① a) LHS.
b) overestimate
c) $n=6$
d) $\Delta t = 2$
e) $2(4) + 2(2.8) + 2(2.1) + 2(1.5) + 2(.7)$
$2(4 + 2.8 + 2.1 + 1.5 + .7)$
$2(11.1)$
≈ 22.2

④

t (sec)	0	1	2	3	4	5
vel (ft/sec)	88	60	40	25	10	0



Area Units:
$= \frac{(ft)(sec)}{sec}$
$= ft.$

a)
upper est: LHS $= 1(88 + 60 + 40 + 25 + 10)$
$1(223) = 223$ ft.

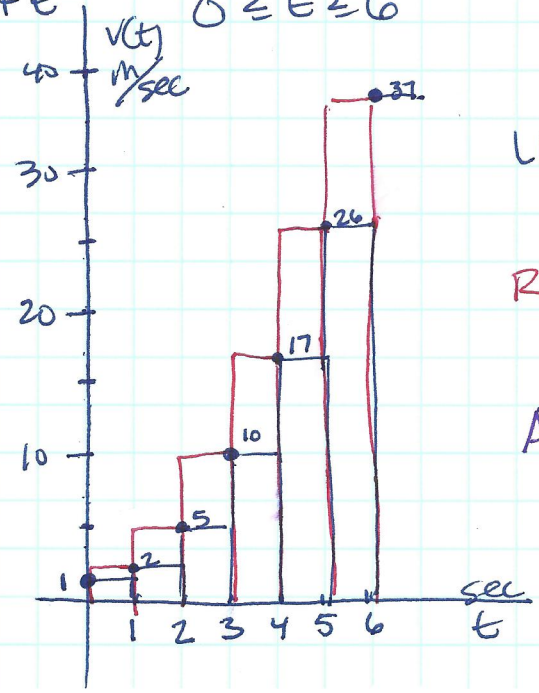
lower est: RHS $= 1(60 + 40 + 25 + 10 + 0)$
$1(135) = 135$ ft

b) see sketch.

c) (LHS − RHS) $= 88$ ft. = the 1st rectangle.

⑥ $v(t) = 1 + t^2$ $\quad 0 \le t \le 6$

$\Delta t = 2$



LHS $= 1(1 + 2 + 5 + 10 + 17 + 26)$
$= 1(61) = 61$ meters

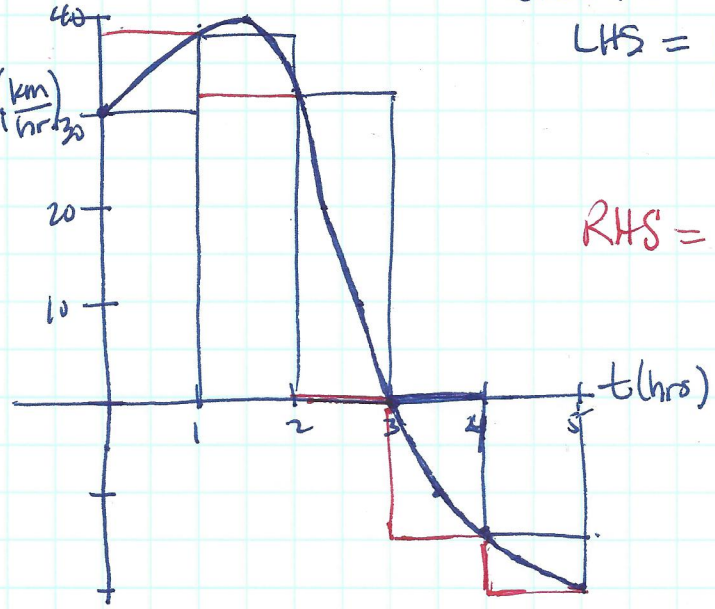
RHS $= 1(2 + 5 + 10 + 17 + 26 + 37)$
$1(97) = 97$ meters.

AVG $\frac{(RHS + LHS)}{2} = \frac{61 + 97}{2}$
$= 79$ meters

Ch 5.1
p. 277 #22

DAY 84 (A)

(22)



Total Distance from home on $t \in (0,5)$

LHS $= 1(30 + 38 + 32 + 0 + -15)$

$1(85) = 85$ km

RHS $= 1(38 + 32 + 0 - 15 - 20)$

$1(35) = 35$ km

$AVG = \left(\frac{LHS + RHS}{2}\right) = \frac{(85+35)}{2} = 60$ km

- At the end of 5 hrs you are 85 km or 35 km or 60 km from home.

- You are farthest from home at time 3 where $v(t) = 0$ and changes signs from (+) to (−)
- Estimates at $t = 3$ hrs for your distance from home.

LHS $= 1(30 + 38 + 32) = 100$ km

RHS $= 1(38 + 32 + 0) = 70$ km

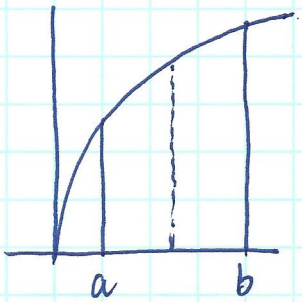
AVG $= 85$ km

Ch. 7.5 NUMERICAL METHODS FOR DEFINITE INTEGRALS

$LHS_{(n)} / RHS_{(n)} / MID_{(n)} / TRAP_{(n)}$

p. 392 #3, 8, 9, 16–18, 25.

(3)



increasing

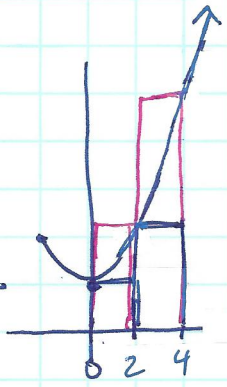
a) $LHS_{(2)}$ underestimate b) $RHS_{(2)}$ overestimate

concave down

c) $TRAP_{(2)}$ underestimate d) $MID_{(2)}$ overestimate.

(8) $\int_0^4 (x^2+1)\,dx$

x	0	1	2	3	4
x^2+1	1	2	5	10	17



INCREASING

a) $LHS_{(2)} = (2)(1+5) = 12$ ∴ underestimate

$RHS_{(2)} = (2)(5+17) = 24$ ∴ overestimate

b) illustrate graphically ✓

(9) Same as #8

$MID_{(2)} = (2)(2+10) = 24$

Concave up ∴ underestimate

$TRAP_{(2)} = \frac{1}{2}(2)(1+5) + \frac{1}{2}(2)(5+17)$ ∴ overestimate

$= \frac{1}{2}(2)(1+5+5+17)$

$= 28$

(16) Total distance traveled $= \int_0^6 v(t)\,dt$

t	0	1	2	3	4	5	6
v(t)	3	4	5	4	7	8	11

estimates $LHS = 1(3+4+5+4+7+8) = 31$ units.

$RHS = 1(4+5+4+7+8+11) = 39$ units.

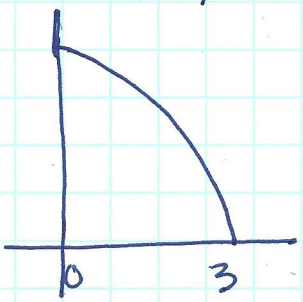
$TRAP = \frac{1}{2}(1)\left((3+4)+(4+5)+(5+4)+(4+7)+(7+8)+8+11\right)$

$\frac{1}{2}(1)\left(3+2(4+5+4+7+8)+11\right) = \frac{1}{2}(70) = 35$

OR $\frac{1}{2}(LHS+RHS) = \frac{31+39}{2} = \frac{70}{2} = 35$

CH 7.5 p. 392 #17-18, 25

(17) $\int_0^3 f(x)\,dx$



decreasing & concave down.

$\therefore$

$$\underline{RHS_{(n)}} \le \underline{TRAP_{(n)}} \le \int_0^3 f(x)\,dx \le \underline{MID_{(n)}} \le \underline{LHS_{(n)}}$$

(18) $\int_0^1 g(t)\,dt$

a) $0.601 \le 0.632 \le \int_0^1 g(t)\,dt \le 0.633 \le 0.664$

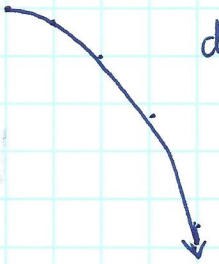
$$\underline{RHS_{(n)}} \le \underline{MID_{(n)}} \le \int_0^1 g(t)\,dt \le \underline{TRAP_{(n)}} \le \underline{LHS_{(n)}}$$

decreasing & concave up.

b) $0.632 \le \int_0^1 g(t)\,dt \le 0.633.$

(25)

x	0	3	6	9	12
f(x)	100	97	90	78	55
	$\downarrow$ -3	$\downarrow$ -7	$\downarrow$ -12	-23	
		$\downarrow$ -4	$\downarrow$ -5	$\downarrow$ -11	



decreasing & concave down

$$\underline{RHS} \le \underline{TRAP} \le \int_0^{12} f(x)\,dx \le \underline{MID} \le \underline{LHS}$$

$TRAP = \frac{1}{2}(3)\left(100 + 2(97+90+78) + 55\right) = 1027.5$ underestimate b/c f(x) is ccd.

X $MID = \frac{1}{2}(6)(97+78) = 525$ not good estimate.... not enough data to get good est. using midpts.