CH 5-REVIEW PG 310-313 # 5, 7, 17, 23, 32-36, 53

DAY 89 (E)

(5)

t	0	20	40	60	80	100
$f(t)$	1.2	2.8	4	4.7	5.1	5.2

$\int_0^{100} f(t)\,dt = ?$ LHS $\approx (20)(1.2 + 2.8 + 4 + 4.7 + 5.1) = (20)(17.8) = 356$

RHS $\approx (20)(2.8 + 4 + 4.7 + 5.1 + 5.2) = (20)(21.8) = 436$

(7)

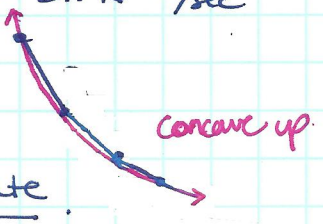
t (sec)	0	1	2	3	4	5
$a(t)$ (m/sec^2)	9.81	8.03	6.53	5.38	4.41	3.61

a) $\int_a^b a(t)\,dt = v(t)$ $\int_0^5 a(t)\,dt = ?$

upperest: LHS $= (1)(9.81 + 8.03 + 6.53 + 5.38 + 4.41) = 34.16$ m/sec

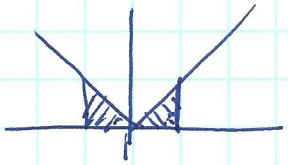
lowerest: RHS $= (1)(8.03 + 6.53 + 5.38 + 4.41 + 3.61) = 27.96$ m/sec

b) TRAP $= \frac{1}{2}(\text{LHS} + \text{RHS}) = \frac{(34.16 + 27.96)}{2} = 31.06$ m/sec



Concave up w/ trapezoid sum is an overestimate.

(17) $\int_{-1}^{1} |x|\,dx$



$\int_0^1 |x|\,dx + \int_{-1}^0 |x|\,dx$

$\frac{1}{2}(1)(1) + \frac{1}{2}(1)(1) = 2.$

(23) E = emissions of nitrogen oxides in millions of metric tons per year in US.
t = # years since 1970. E = f(t).

a) $\int_0^{30} f(t)\,dt \Rightarrow$ millions of metric tons of nitrogen oxide emissions over 30 years from 1970 to 2000.

b) Estimates using table

LHS $= (5)(26.9 + 26.4 + 27.1 + 25.8 + 25.5 + 25.0) = 5(156.7) = 783.5$

RHS $= (5)(26.4 + 27.1 + 25.8 + 25.5 + 25.0 + 22.6) = (5)(132.4) = 662$

TRAP Sum $= \frac{1}{2}(\text{LHS} + \text{RHS}) = 722.75$

CH 5 REVIEW p. 310-313 # 32-36, 53

DAY 89 (E)

(32) $f(x)$ is odd $\int_{-2}^{5} f(x)\,dx = 8$

$\int_{-2}^{2} f(x)\,dx = 0 \quad \therefore \int_{2}^{5} f(x)\,dx = 8$

(33) $f(x)$ is even $\int_{-2}^{2} f(x)\,dx = 6 \quad \int_{-5}^{5} f(x)\,dx = 14$

$\int_{0}^{2} f(x)\,dx = 3 \quad \int_{0}^{5} f(x)\,dx = 7$

$\int_{2}^{5} f(x)\,dx = \int_{0}^{5} f(x)\,dx - \int_{0}^{2} f(x)\,dx = 7 - 3 = 4$

(34) $\int_{2}^{5} (3f(x) + 4)\,dx = 18 \qquad 3\int_{2}^{5} f(x)\,dx + \int_{2}^{5} 4\,dx = 18$

$3\int_{2}^{5} f(x)\,dx + 4(3) = 18$

$3\int_{2}^{5} f(x)\,dx = 6$

$\int_{2}^{5} f(x)\,dx = 2$

(35) $\int_{2}^{4} 2f(x)\,dx = 8 \qquad \int_{5}^{4} f(x)\,dx = 1$

$\int_{2}^{4} f(x)\,dx = 4 \qquad \int_{4}^{5} f(x)\,dx = -1$

$\therefore \int_{2}^{5} f(x)\,dx = \int_{2}^{4} f(x)\,dx + \int_{4}^{5} f(x)\,dx$

$= 4 + -1$

$= 3$

(36) a) $\int_{-2}^{2} \sin x\,dx \qquad$ b) $\int_{-\pi}^{\pi} x^{113}\,dx$

$f(x) = \sin x$ odd $\quad \therefore \int_{-2}^{2} \sin x\,dx = 0$

$f(x) = x^{113}$ odd $\quad \therefore \int_{-\pi}^{\pi} x^{113}\,dx = 0$

(53) $f(x)$ = even a) if $\int_{0}^{2} f(x)\,dx = M$ then $\int_{-2}^{2} f(x)\,dx = 2M$

b) if $\int_{0}^{5} f(x)\,dx = M$ & $\int_{2}^{5} f(x)\,dx = N$ then $\int_{0}^{2} f(x)\,dx = N - M$

c) if $\int_{-2}^{5} f(x)\,dx = M$ & $\int_{-2}^{2} f(x)\,dx = N$

then $\int_{-2}^{5} f(x)\,dx - \frac{1}{2}\int_{-2}^{2} f(x)\,dx = \int_{0}^{5} f(x)\,dx$

$\int_{0}^{5} f(x)\,dx = M - \frac{1}{2}N$