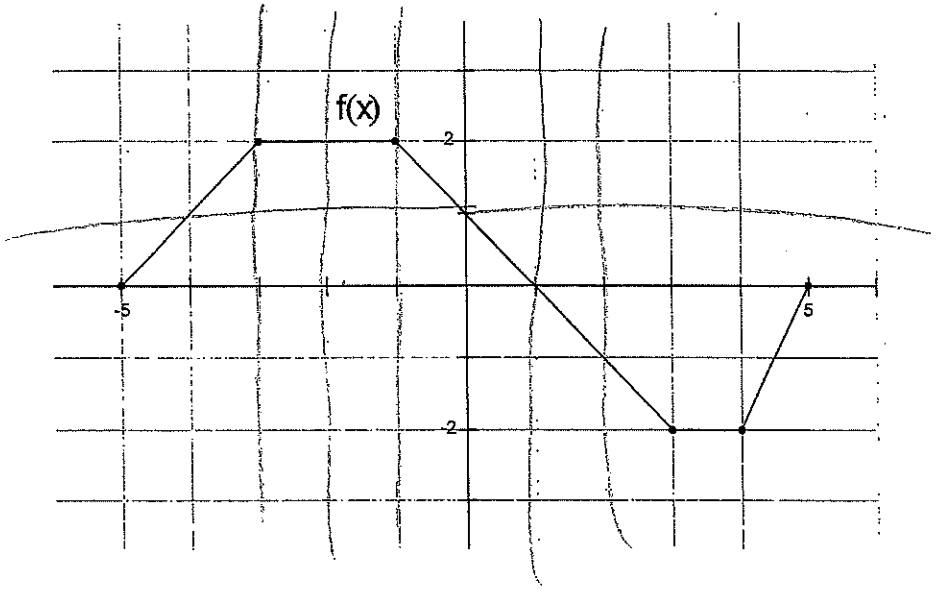
Basic Integration

1. Consider the function $f(x)$ shown in the graph below. Use the graph to find the integrals that follow.



a. $\int_{-3}^{-3} f(x)\,dx$

b. $\int_{-5}^{1} f(x)\,dx$

c. $\int_{-5}^{3} f(x)\,dx$

d. $\int_{-5}^{5} f(x)\,dx$

e. $\int_{-3}^{-5} f(x)\,dx$

f. $\int_{5}^{1} f(x)\,dx$

g. $\int_{5}^{-5} f(x)\,dx$

h. $\int_{-5}^{5} |f(x)|\,dx$

i. $\int_{-5}^{1} (f(x)+2)\,dx$

j. $\int_{-5}^{1} 3f(x)\,dx$

k. $\int_{-5}^{5} (3+|f(x)|)\,dx$

Generalizations Now make some generalizations about integration.

Review Trapezoidal method
p 316 #3,5,7,

2. Suppose that the following is known about a function f:

$$\int_0^3 f(x)dx = 4 \qquad \text{and} \qquad \int_3^6 f(x)dx = -1$$

Find the following integrals.

a. $\int_0^6 f(x)dx$

b. $\int_6^3 f(x)dx$

c. $\int_0^3 4f(x)dx$

d. $\int_3^3 f(x)dx$

3. Evaluate the following integrals by making a graph of the function over the relevant interval.

a. $\int_{-3}^5 3\,dx$

b. $\int_1^4 x\,dx$

c. $\int_{-2}^4 (2-x)dx$

d. $\int_0^6 |x-3|\,dx$

e. $\int_{-4}^4 \sqrt{16-x^2}\,dx$

f. $\int_0^3 \left(3-\sqrt{9-x^2}\right)dx$

Lesson 6- review for test-CW

1. Estimate the total distance travelled- using data from the table

a left Riemann sum with 6 sub intervals

a midpoint Riemann with 3 sub intervals

Explain the meaning of your answer

t (min)	1	2	3	4	5	6	7
V (t) (ft/min)	20	30	35	40	50	45	35

2. Estimate $\int_1^3 (x \sin x)dx$ by using the trapezoidal method with 4 equal subintervals

(Use your table feature of the calculator)

Then use your graphing calculator to evaluate the integral- accurate to 3 decimal places

3

[No Calculator] Suppose $\int_1^2 f(x)dx = 3$, $\int_1^5 f(x)dx = -13$, and $\int_1^5 g(x)dx = 7$. Find each of the following:

a) $\int_3^3 g(x)dx$

b) $\int_5^1 f(x)dx$

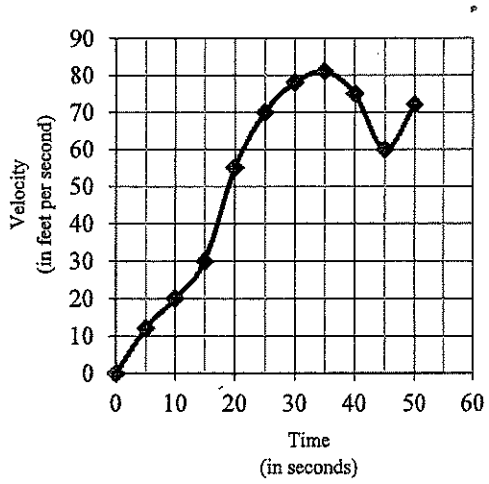
c) $\int_1^5 [g(x) - f(x)]dx$

d) $\int_2^5 f(x)$

e) $\int_1^5 [3f(x) - g(x)]dx$

f) $\int_1^5 \frac{g(x)}{4}dx$

Time (in seconds)	$v(t)$ (in ft/sec)
0	0
5	12
10	20
15	30
20	55
25	70
30	78
35	81
40	75
45	60
50	72



14. The graph of the velocity $v(t)$, in ft/sec, of a car traveling on a straight road, for $0 \le t \le 50$, is shown above. A table of values for $v(t)$, at 5 second intervals of time t, is shown to the right of the graph.

a) During what intervals of time is the acceleration of the car positive? Give a reason for your answer.

b) Find the average acceleration of the car, in ft/sec^2, over the interval $0 \le t \le 50$.

c) Approximate $\int_0^{50} v(t)\,dt$ with a Riemann sum, using the midpoints of five subintervals of equal length. Using correct units, explain the meaning of this integral.