Integration Review
Calculus AB

Name: Key
Date:

I. Given $y = x\sin x$ on the interval $[0, 1]$. Using 4 subinterval find
a) Left hand Rectangular Approximation
b) Right hand Rectangular approximation
c) Find Midpoint Rectangular approximation

$\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

0 $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$ 1

LRAM: .203
RRAM: .414
MRAM: .298

II. Suppose that f and g are continuous functions and that

$$\int_1^2 f(x)dx = -4 \qquad \int_1^5 f(x)dx = 6 \qquad \int_1^5 g(x)dx = 8$$

1 2 5

-4

6

Find

a) $\int_2^2 f(x)dx$ 0

b) $\int_1^5 g(x)dx$ 8

c) $\int_1^2 3f(x)dx$ −12

d) $\int_2^5 f(x)dx$ 10

e) $\int_1^5 [f(x)+g(x)]dx$ 14

f) $\int_1^5 [4f(x)-g(x)]dx$ 16

1 2 5

-4

III. Suppose that f and h are continuous functions such that

$$\int_1^9 f(x)dx = -1 \qquad \int_7^9 f(x)dx = 5 \qquad \int_7^9 h(x)dx = 4$$

6

Find

a) $\int_1^9 -2f(x)dx$ 2

b) $\int_7^9 [f(x)+h(x)]dx$ 9

c) $\int_7^9 [2f(x)-h(x)]dx$ 6

d) $\int_9^1 f(x)dx$ 1

e) $\int_1^7 f(x)dx$ −6

f) $\int_9^7 [h(x)-f(x)]dx$ 1

IV. Evaluate each integral

a) $\int_3^1 7dx$ −14

b) $\int_0^9 5\sqrt{x}dx$ 90

c) $\int_2^3 \frac{x^2+2x^3}{x^2}dx$ 6

d) $\int_0^{\sqrt{2}} (t-\sqrt{2})dt$ −1

$\frac{t^2}{2} - \sqrt{2}t$

e) $\int_0^{\pi} (e^x + \cos x)dx$ $e^{\pi} - 1$

f) $\int_0^4 \sqrt{x}(x+1)dx$ $\frac{272}{15}$

V. Find dy/dx of the following

a. $y = \int_0^x \sqrt{1+t^2}\,dt$

$\sqrt{1+x^2}$

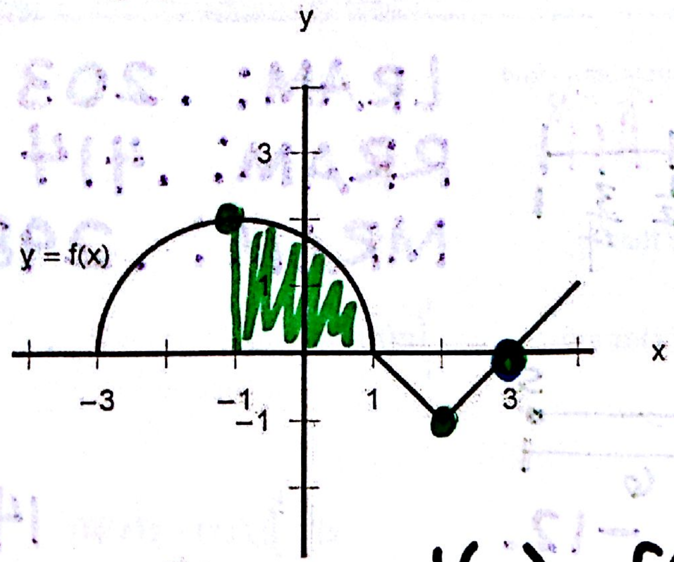
b. $y = \int_0^{\sqrt{x}} \sin(t^2)dt$

$\frac{\sin x}{2\sqrt{x}}$

c. $y = \int_{x^2}^0 \cos t\,dt$

$-2x\cos(x^2)$

5. The graph of a function *f* consists of a semicircle and two line segments as shown below.



$-\int_{-1}^{1} f(t)\,dt$

$\int_{1}^{-1} f(t)\,dt$

Let $g(x) = \int_1^x f(t)\,dt$

$g'(x) = f(x)$

(a) Find g(1)

0

(b) Find g(3)

-1

(c) Find g(-1)

$-\pi$

(d) Find all values of x on the open interval (-3, 4) at which *g* has a local minimum.

$x = 3$

(e) Write an equation for the line tangent to the graph of *g* at x = -1.

$g'(-1) = f(-1) = 2$

$g(-1) = \int_1^{-1} f(t)$

$-\pi$

$y + \pi = 2(x+1)$

(f) Find the x-coordinate of each point of inflection of the graph of g on the open interval (-3, 4).

slope of f changes

$x = -1$

$x = 2$

$g'(x) = f(x)$

$g''(x) = f'(x)$

$-\int_{-1}^{1} f(t)$

$-\pi$

(g) Find the range of *g*.

$[-2\pi, 0]$

$g(-3) = -2\pi$

$g(1) = 0$

$\int_1^x$