

Calculus

Ch. 5 Review

Use a finite approximation to estimate the area of the region enclosed between the graph of f and the x -axis for $a \leq x \leq b$.

1) $f(x) = x^2$, $a = 2$, $b = 6$ 1) _____
Use LRAM with four rectangles of equal width.

2) $f(x) = x^2$, $a = 2$, $b = 6$ 2) _____
Use RRAM with four rectangles of equal width.

3) $f(x) = x^2$, $a = 2$, $b = 6$ 3) _____
Use MRAM with four rectangles of equal width.

Estimate the value of the quantity.

4) The table shows the velocity of a remote controlled race car moving along a dirt path for 8 seconds. Estimate the distance traveled by the car using 8 subintervals of length 1 with left-end point values. 4) _____

Time (sec)	Velocity (in./sec)
0	0
1	10
2	20
3	16
4	26
5	29
6	31
7	12
8	5

Graph the integrand and use areas to evaluate the integral.

5) $\int_{-4}^4 \sqrt{16 - x^2} dx$ 5) _____

Use areas to evaluate the integral.

6) $\int_a^{3a} x dx$, $a > 0$ 6) _____

Use NINT on a calculator to find the numerical integral of the function over the specified interval.

7) $\int_0^2 x^2 e^{4x} dx$

7) _____

Find the points of discontinuity of the integrand on the interval of integration, and use area to evaluate the integral.

8) $\int_{-4}^5 \frac{x^2 - 9}{x + 3} dx$

8) _____

9) Suppose that f and g are continuous and that $\int_3^5 f(x) dx = 7$, $\int_3^5 g(x) dx = 2$, and $\int_0^5 g(x) dx = 4$.

9) _____

Which of the following must be true?

I. $\int_0^3 g(x) dx = 2$

II. $\int_3^5 [f(x)g(x)] dx = 14$

III. $\int_3^5 [f(x) - g(x)] dx = 5$

- A) I and II
- B) III only
- C) I and III
- D) I, II, and III
- E) II and III

Evaluate the definite integral.

10) $\int_1^3 (2x^3 - 6x^{-2}) dx$

10) _____

Find the average value over the given interval.

11) $y = 42x + 3; [2, 9]$

11) _____

Find dy/dx .

12) $D_x \int_0^x \sqrt{6t + 5} dt$

12) _____

Evaluate the integral. DO NOT USE A CALCULATOR!

13) $\int_0^{\pi/2} 13 \sin x dx$

13) _____

14) Using the function $y = x^2 - 6x + 9; 2 \leq x \leq 4$:

- a.) Graph the function over the interval.
- b.) Integrate the function over the interval.
- c.) Find the total area of the region between the curve and the x -axis.

14) _____

Use your calculator to approximate the integral using the method indicated.

15) Trapezoidal Rule: $\int_0^{\pi} \sin x dx, n = 10$

15) _____

16) Simpson's Rule: $\int_0^3 \sqrt{x+4} \, dx$, $n = 100$

16) _____

Solve the problem.

17) A particle moves with velocity $v(t) = 2t + 7$ find the distance traveled between $t = 1$ and $t = 5$.

17) _____

Evaluate the definite integral using an antiderivative.

18) $\int_{-2}^{-1} 6x^{-4} \, dx$

18) _____

Solve the problem.

19) A particle starts at $x = 0$ and moves along the x -axis with velocity $v(t) = 0.2$ for time $t \geq 0$. Where is the particle at $t = 7$?

19) _____