Test Form A — **Name** ______________ **Date** __________

Chapter 4 — **Class** ______________ **Section** __________

1. Evaluate the integral: $\int \sqrt[3]{t}\,dt$.

(a) $\frac{3}{4}t^{4/3} + C$ (b) $\sqrt[3]{\frac{1}{2}t^2} + C$ (c) $\frac{3}{2}t^{2/3} + C$

(d) $\frac{1}{3t^{2/3}} + C$ (e) None of these

3. Evaluate the integral: $\int \frac{x^3 + x}{x}\,dx$.

(a) $x^3 + 3x + C$ (b) $2x + C$ (c) $\frac{x^3}{3} + x + C$

(d) $\frac{2x^3 + x - 1}{x^2}$ (e) None of these

4. Evaluate the integral: $\int \frac{\sin^3\theta}{1 - \cos^2\theta}\,d\theta$.

(a) $-\cos\theta + C$ (b) $\cos\theta + C$ (c) $\frac{\cos\theta[3 - 3\cos^2\theta - 2\sin^2\theta]}{1 - \cos^2\theta}$

(d) $\frac{1}{2}\sin^2\theta + C$ (e) None of these

5. Find $y = f(x)$ if $f''(x) = x^2$, $f'(0) = 7$ and $f(0) = 2$.

(a) $x^2 + 9$ (b) $\frac{1}{12}x^4 + 7x + 2$ (c) $x^2 + 7x + 2$

(d) $x^4 + 84x + 24$ (e) None of these

6. Use $a(t) = -32$ feet per second squared as the acceleration due to gravity. A ball is thrown vertically upward from the ground with an initial velocity of 96 feet per second. How high will the ball go?

(a) 32 feet (b) 64 feet (c) 24 feet

(d) 144 feet (e) None of these

7. Use the properties of sigma notation and the summation formulas to evaluate the given sum: $\sum_{i=1}^{10}(i^2 - 2i + 3)$

(a) 83 (b) 245 (c) 305

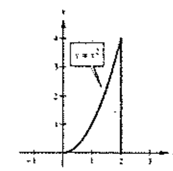
(d) 81 (e) None of these

8. Let $s(n) = \sum_{i=1}^{n}\left(1 + \frac{i}{n}\right)^2\left(\frac{2}{n}\right)$. Find the limit of $s(n)$ as $n \to \infty$.

(a) $\frac{17}{12}$ (b) $\frac{10}{3}$ (c) $\frac{14}{3}$

(d) $\frac{20}{3}$ (e) None of these

9. Which of the following definite integrals represents the area of the shaded region?



(a) $\int_0^4 x^2\,dx$ (b) $\int_0^2 x^2\,dx$

(c) $\int_1^2 x^2\,dx$ (d) $\int_0^2 x^2$

(e) None of these

10. Use the Fundamental Theorem of Calculus to evaluate the integral: $\int_1^4 \sqrt{x}\,dx$.

(a) 1 (b) $-\frac{14}{3}$ (c) 7

(d) $\frac{14}{3}$ (e) None of these

11. Find the average value of $f(x) = 2x^2 + 3$ on the interval $[0, 2]$.

(a) $\frac{22}{3}$ (b) $\frac{17}{3}$ (c) 4

(d) 27 (e) None of these

12. Evaluate the integral: $\int x^2(x^3 + 5)^6\,dx$.

(a) $\frac{1}{21}(x^3 + 5)^7 + C$ (b) $\frac{1}{7}(x^3 + 5)^7 + C$ (c) $\frac{x^3(x^3 + 5)^7}{21} + C$

(d) $\frac{x^3}{3}\left(\frac{x^4}{4} + 5x\right)^6 + C$ (e) None of these

14. Evaluate the integral: $\int \cos 3x\,dx$.

(a) $\sin 3x + C$ (b) $-\sin 3x + C$ (c) $-\sin\frac{3}{2}x^2 + C$

(d) $\frac{1}{3}\sin 3x + C$ (e) None of these

15. Evaluate the integral: $\int x\sqrt{1 - x}\,dx$.

(a) $-\frac{x^2}{3}(1 - x)^{3/2} + C$ (b) $\frac{2 - 3x}{2\sqrt{1 - x}} + C$ (c) $\frac{x^2}{3}(1 - x)^{3/2} + C$

(d) $-\frac{2}{15}(2 + 3x)(1 - x)^{3/2} + C$ (e) None of these

Test Form A

1. a	[redacted]	3. c	4. a
5. b	6. d	7. c	8. c
9. b	10. d	11. b	12. a
[redacted]	14. d	15. d	[redacted]

Test Form B Name ____________ Date ________

Chapter 4 Class ____________ Section ________

1. Evaluate the integral: $\int \sqrt[3]{x^2}\,dx$.

(a) $\sqrt[3]{\frac{x^3}{3}} + C$ (b) $\frac{5}{7}x^{7/5} + C$ (c) $-\frac{1}{9x^9} + C$

(d) $-\frac{1}{4x^3} + C$ (e) None of these

3. Evaluate the integral: $\int \frac{x^4 - x^3}{x^2}\,dx$.

(a) $2x^3 - 3x^2 + C$ (b) $\frac{x^3}{3} - \frac{x^2}{2} + C$ (c) $2x - 1 + C$

(d) $\frac{3}{20}(4x^2 - 5x) + C$ (e) None of these

5. Find $y = f(x)$ if $f''(x) = x + 2$, $f'(0) = 3$, $f(0) = -1$.

(a) $\frac{1}{6}x^3 + x^2 + 3x - 1$ (b) $\frac{x^3}{6} + 2x^2 + C$ (c) $x^3 + 6x^2 + 18x - 6$

(d) $\frac{1}{6}x^3 + x^2 + \frac{21}{2}x + \frac{61}{6} + C$ (e) None of these

6. Use $a(t) = -32$ feet per second squared as the acceleration due to gravity. A ball is thrown vertically upward from the ground with an initial velocity of 56 feet per second. For how many seconds will the ball be going upward?

(a) $1\frac{3}{4}$ sec (b) 24 sec (c) $\frac{7}{8}$ sec

(d) 1 sec (e) None of these

7. Use the properties of sigma notation and the summation formulas to evaluate the given sum: $\sum_{i=1}^{10}(i^2 + 3i - 2)$

(a) 530 (b) 128 (c) 126

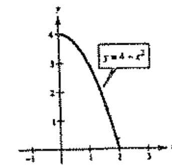
(d) 915 (e) None of these

8. Let $s(n) = \sum_{i=1}^{n}\left(1 + \frac{i}{n}\right)^2\left(\frac{1}{n}\right)$. Find the limit of $s(n)$ as $n \to \infty$.

(a) $\frac{5}{3}$ (b) $\frac{7}{3}$ (c) $\frac{10}{3}$

(d) $\frac{17}{24}$ (e) None of these

9. Which of the following definite integrals represents the area of the shaded region?



(a) $\int_0^2 (4 - x^2)$ (b) $\int_4^2 (4 - x^2)\,dx$

(c) $\int_0^2 (4 - x^2)\,dx$ (d) $\int_2^4 (4 - x^2)\,dx$

(e) None of these

10. Use the Fundamental Theorem of Calculus to evaluate the integral: $\int_1^2 \frac{1}{x^2}\,dx$.

(a) $-\frac{1}{x} + C$ (b) $-\frac{3}{4}$ (c) $\frac{1}{2}$

(d) $-\frac{3}{2}$ (e) None of these

11. Find the average value of $f(x) = 3x^2 - 2$ on the interval $[0, 2]$.

(a) 1 (b) 5 (c) 6

(d) 2 (e) None of these

12. Evaluate the integral: $\int x(x^2 - 1)^4\,dx$.

(a) $\frac{1}{10}(x^2)(x^2 - 1)^5$ (b) $\frac{1}{10}(x^2 - 1)^5 + C$ (c) $\frac{1}{5}(x^3 - x)^5 + C$

(d) $\frac{1}{5}(x^2 - 1)^5 + C$ (e) None of these

15. Evaluate the integral: $\int x\sqrt{x + 1}\,dx$.

(a) $\frac{3x + 2}{2\sqrt{x + 1}} + C$ (b) $\frac{2}{15}(x + 1)^{3/2}(3x - 2) + C$ (c) $\frac{1}{4}(x + 1)(x - 1) + C$

(d) $\frac{1}{3}x^2(x + 1)^{3/2} + C$ (e) None of these

16. Use Trapezoidal Rule with $n = 4$ to approximate $\int_2^3 \frac{1}{(x - 1)^2}\,dx$.

(a) 0.5004 (b) 2.5000 (c) 0.5090

(d) 1.7396 (e) None of these

Test Form B

1. b	[redacted]	3. b	[redacted]
5. a	6. a	7. a	8. b
9. c	10. c	11. d	12. b
[redacted]	[redacted]	15. b	16. c

Test Form C Name ______ Date ______

Chapter 4 Class ______ Section ______

A graphing calculator/utility is recommended for this test.

1. Evaluate the integral: $\int (ax + b)\,dx$.

(a) $\frac{ab}{2}x^2 + C$ (b) $a + C$ (c) $\frac{a}{2}x^2 + bx + C$

(d) $\frac{a}{2}x^2 + bx$ (e) None of these

2. Evaluate the integral: $\int \frac{3 + 4x^{3/2}}{\sqrt{x}}\,dx$.

(a) $\frac{3}{2}\sqrt{x} + 2x^2 + C$ (b) $-\frac{3}{2}x^{-3/2} + 4 + C$ (c) $\frac{3}{2}x^{-3/2} + 2x^2 + C$

(d) $6\sqrt{x} + 2x^2 + C$ (e) None of these

3. Find the particular solution of the equation $f'(x) = 2x^{-1/2}$ that satisfies the condition $f(1) = 6$.

(a) $4\sqrt{x} + 2$ (b) $4\sqrt{x} + C$ (c) $\sqrt{2x} + 6 - \frac{2}{\sqrt{2}}$

(d) $2\sqrt{x} + 4$ (e) None of these

4. The rate of growth of a particular population is given by

$$\frac{dP}{dt} = 50t^2 - 100t^{3/2},$$

where P is the population size and t is the time in years. The initial population is 25,000. Use a graphing utility to graph the population function. Then use the graph to estimate how many years it will take for the population to reach 50,000.

(a) 15.7 (b) 14.5 (c) 2

(d) 38.4 (e) None of these

6. Identify the sum that does not equal the others.

(a) $\sum_{n=0}^{5}(3n + 1)$ (b) $\sum_{k=1}^{6}(3k - 2)$ (c) $\sum_{j=3}^{8}(3j - 8)$

(d) $\sum_{i=1}^{6}(i + 2)$ (e) None of these

7. Use a graphing utility to graph $f(x) = -2x^3 - 3x^2 + 5$. Then use the upper sums to approximate the area of the region between the x-axis and f on the interval $[0, 1]$ using 4 subintervals.

(a) 2.81 (b) 4.06 (c) 3.5

(d) 3 (e) None of these

8. Determine the interval(s) on which $f(x) = [\![x + 2]\!]$ is integrable.

(a) $[0, 5]$ (b) $[-3, 0]$ (c) $[-1, 4]$

(d) a, b, and c (e) a and c

9. Use a graphing utility as an aid in finding the area of the region above the x-axis bounded by $f(x) = 5x^3 - 35x + 30$.

(a) 10 (b) 160 (c) -3.75

(d) 55 (e) None of these

10. Consider $F(x) = \int_x^1 \sqrt{1 + t^2}\,dt$. Find $F'(x)$.

(a) $\sqrt{1 + x^2}$ (b) $\frac{1}{\sqrt{2}} - \frac{x}{\sqrt{1 + x^2}}$ (c) 1

(d) $-\sqrt{1 + x^2}$ (e) None of these

11. Choose the correct quantity to fill in the blank: $\int$ ______ $dx = (ax^2 - a^2)^4 + C$.

(a) $(ax^2 - a^2)^3$ (b) $4(ax^2 - a^2)^3$ (c) $\frac{1}{5}(ax^2 - a^2)^5$

(d) $4a(ax^2 - a^2)^3$ (e) None of these

13. Use a graphing utility as an aid in finding the area in the second quadrant bounded by the x-axis and $f(x) = x^2\sqrt{\frac{x^3}{8} + 1}$.

(a) $\frac{1}{4}$ (b) $\frac{8}{3} \approx 2.667$ (c) $\frac{16}{9} \approx 1.778$

(d) $\frac{16}{9}(1 - 2^{3/2})$ (e) None of these

14. Use the general power rule to evaluate the integral: $\int x\sqrt{9 - 5x^2}\,dx$.

(a) $-\frac{1}{10}(9 - 5x^2)^{3/2} + C$ (b) $-\frac{1}{15}(9 - 5x^2)^{3/2} + C$ (c) $\frac{2}{3}(9 - 5x^2)^{3/2} + C$

(d) $-\frac{4}{15}(9 - 5x^2)^{3/2} + C$ (e) None of these

15. Evaluate the integral: $\int \frac{5x}{\sqrt{x + 2}}\,dx$.

(a) $\frac{2}{3}\sqrt{x + 2}\,(x - 4) + C$ (b) $\frac{5}{2}\left(x - 4\ln\sqrt{x + 2}\right) + C$ (c) $5\left(x - 4\ln\sqrt{x + 2}\right) + C$

(d) $\frac{10}{3}\sqrt{x + 2}\,(x - 4) + C$ (e) None of these

Test Form C

1. c	2. d	3. a	4. a
[redacted]	6. d	7. b	8. d
9. b	10. d	11. e	[redacted]
13. c	14. b	15. d	

Test Form D Name ________ Date ________

Chapter 4 Class ________ Section ________

1. Evaluate the integral: $\int \sqrt{x^3}\, dx$.

3. Evaluate the integral: $\int \frac{x^3 - x^2}{x^2}\, dx$.

4. Evaluate the integral: $\int \frac{\cos^3 \theta}{2 - 2\sin^2 \theta}\, d\theta$.

5. Find the function, $y = f(x)$, if $f'(x) = 2x - 1$ and $f(1) = 3$.

6. Use $a(t) = -32$ feet per second squared as the acceleration due to gravity. An object is thrown vertically downward from the top of a 480-foot building with an initial velocity of 64 feet per second. With what velocity does the object hit the ground?

7. Let $s(n) = \sum_{i=1}^{n}\left(1 + \frac{2i}{n}\right)\left(\frac{2}{n}\right)$. Find the limit of $s(n)$ as $n \to \infty$.

8. Write the definite integral that represents the area of the region enclosed by $y = 4x - x^2$ and the x axis.

9. Evaluate: $\frac{d}{dx}\int_2^x (2t^2 + 5)^2\, dt$.

10. Use the Fundamental Theorem of Calculus to evaluate $\int_{-1}^{1} \left(\sqrt[3]{t} - 2\right) dt$.

11. Find the average value of $f(x) = \sin x$ on the interval $\left[\frac{\pi}{4}, \frac{\pi}{2}\right]$.

12. Evaluate the integral: $\int_0^1 x\sqrt{1 - x^2}\, dx$.

13. Evaluate the integral: $\int \frac{\sec^2 x}{\sqrt{\tan x}}\, dx$.

15. Find the indefinite integral: $\int \frac{x}{\sqrt{x - 1}}\, dx$.

Test Form D

1. $\frac{2}{5}x^{5/2} + C$ [redacted]

3. $\frac{x^2}{2} - x + C$ 4. $\frac{1}{2}\sin\theta + C$

5. $y = x^2 - x + 3$ 6. -186.6 ft/s 7. 4

8. $\int_0^4 (4x - x^2)\, dx$ 9. $(2x^2 + 5)^2$ 10. -4

11. $\frac{2\sqrt{2}}{\pi}$ 12. $\frac{1}{3}$ 13. $2\sqrt{\tan x} + C$ [redacted]

15. $\frac{2}{3}\sqrt{x - 1}(x + 2) + C$ [redacted]

Test Form E | Name ______________ | Date ______________
Chapter 4 | Class ______________ | Section ______________

A graphing calculator/utility is recommended for this test.

1. Evaluate the integral: $\int \frac{ax^2 + bx^3}{\sqrt{x}}\,dx$.

2. Evaluate the integral: $\int \frac{x}{(x-1)^3}\,dx$.

3. Find the function, $y = f(x)$, if $f'(x) = 2x - 1$ and $f(1) = 3$.

4. The rate of growth of a particular population is given by

$$\frac{dP}{dt} = 40t^3 - 70t^{4/3},$$

where P is the population size and t is the time in years. The initial population is 16,000.

a. Determine the population function.

b. Use a graphing utility to graph the function. Then use the graph to estimate the number of years until the population reaches 20,000. (Round your answer to one decimal place.)

c. Use the population function to calculate the population after 8 years.

6. Evaluate the integral: $\int \sqrt{x^3}\,dx$.

7. Use a graphing utility to graph $f(x) = x^4 - 6x^3 + 11x^2 - 6x$. Then use the upper sums to approximate the area of the region in the first quadrant bounded by f and the x-axis using 4 subintervals. (Round your answer to three decimals places.)

8. Use a graphing utility as an aid to sketch the region whose area is indicated by the integral:

$$\int_0^2 (-x^3 + 4x + 6)\,dx.$$

9. Determine if $f(x) = \frac{5}{2x-3}$ is integrable on $[0, 2]$. Give a reason for your answer.

10. Use a graphing utility to graph $f(x) = \cos x - \sin x$ on the interval $[0, \pi]$. Calculate the area in the first quadrant bounded by the x-axis and f.

11. Consider $F(x) = \int_2^x \frac{1}{1+t^4}\,dt$. Find $F'(x)$ and $F'(2)$.

12. Evaluate the integral: $\int \frac{\cos\sqrt{x}}{\sqrt{x}}\,dx$.

14. Evaluate the integral: $\int_0^1 x\sqrt{x^2+1}\,dx$.

15. Consider the region bounded by the x-axis, the function $f(x) = \sqrt{1+x^3}$, $x = 1$, and $x = -1$.

a. Use Trapezoidal Rule, with $n = 4$, to approximate the area of the region. (Round the answer to three decimal places.)

Test Form E

1. $\frac{2a}{5}x^{5/2} + \frac{2b}{7}x^{7/2} + C$ 2. $\frac{1-2x}{2(x-1)^2} + C$

3. $y = x^2 - x + 3$

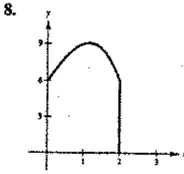
4. a. $P = 10t^4 - 30t^{7/3} + 16{,}000$

b. 4.8 c. 53,120

[redacted]

6. $\frac{2}{5}x^{5/2} + C$ 7. 0.486

8.



9. No, because $f(x)$ is not continuous at $x = \frac{3}{2}$.

10. $\sqrt{2} - 1 \approx 0.414$

11. $F'(x) = \frac{1}{1+x^4}$, $F'(2) = \frac{1}{17}$ 12. $2\sin\sqrt{x} + C$

[redacted] 14. $\frac{1}{3}[2^{3/2} - 1]$

15. a. 1.852 [redacted]

Text

Pg. 306 - 307/3 → 9, 11 → 16, 18 → 26, 28 → 30, 35 → 45, 53, 57 → 62