

This chapter test correlates with:

Calculus of a Single Variable, 8th ed.

by Larson, Hostetler, Edwards

Houghton Mifflin, 2006

Calculus with Analytic Geometry, 8th ed.

or by Larson, Hostetler, Edwards

Houghton Mifflin, 2006

Chapter 4: Integration

[Also:
7th edition, Sections 4.1-4.6
6th edition, Sections 4.1-4.6]

A few notes:

- If you are using a different textbook, this may not be a comprehensive chapter test for you.
- Solutions are available at www.mathprotutoring.com/tests.
- Angle measures are represented using radian measure, unless there is a pressing reason to use degree measure. If degree measure is used, there will always be a ° symbol.
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Calculus Ch. 4 Integration

Questions 1-6: Find the indefinite integral.

1. $\int(3 - 4t^3)dt$

2. $\int \frac{5x^6 - 2x}{\sqrt{x}} dx$

3. $\int(3\sec^2 x + \sec 2x \tan 2x)dx$

4.
$$\int \frac{x^2}{\sqrt[4]{3x^3 + 5}} dx$$

5.
$$\int \frac{1 - \sin^2 y}{\cos^2 y} dy$$

6.
$$\int x\sqrt{x+1} dx$$

7. $\frac{dy}{dx} = (5x + 2)^2$ and y passes through the point $(0,1)$. Find the equation for y .

8. Solve the differential equation:

$$f''(x) = \cos x$$

$$f'(0) = 2$$

$$f(0) = 4$$

9. A rock is thrown downward with an initial velocity of 10 ft/sec from a balcony 90 ft high.
- Find the rock's position function.
 - Find the amount of time it takes for the rock to hit the ground.
 - Find the rock's velocity at impact.

10. Use the upper sum with $n = 4$ to approximate the area between the graph of $f(x) = \frac{1}{2}x^2$ and the x -axis from $x = 2$ to $x = 4$.

11. Use the limit process to find the exact area in Question 8.

Questions 12-14: Evaluate the definite integral.

$$12. \int_{-3}^5 (3x^2 + 4x + 1) dx$$

$$13. \int_{-3}^2 |x - 1| dx$$

$$14. \int_{-\pi/2}^{\pi/2} \cos(2x) dx$$

15. If $\int_1^3 f(x)dx = 5$ and $\int_0^3 f(x)dx = -6$, find the value of $\int_0^1 f(x)dx$.

16. Find the area between the graph of $f(x) = -\sqrt{x+3}$ and the x -axis, from $x = 0$ to $x = 2$.

17. If $f(x) = \int_3^x \sqrt{1 - \sin t} dt$, find $f'(x)$.

18. Use the Trapezoidal Rule with $n = 4$ to estimate the value of $\int_{-1}^3 (2x^2 + 1)dx$.

19. Use Simpson's Rule with $n = 4$ to estimate the value of $\int_{-1}^3 (2x^2 + 1)dx$.