# Integral Calculus Practice

Choose one answer per question. Circle A, B, C, or D.

1. Suppose f is continuous near x = 4 and f(4) = 9. What is the definite integral of f from x = 4 to x = 4?

A. 0
B. 4
C. 9
D. 36

2. The definite integral of g from x = 1 to x = 3 is -4. What is the definite integral of g from x = 3 to x = 1?

A. 2
B. -4
C. 4
D. 0

3. The definite integral of h from x = -1 to x = 2 is 6, and from x = 2 to x = 5 it is -8. What is the definite integral of h from x = -1 to x = 5?

A. 2
B. -2
C. 14
D. -14

4. For x > 0, which expression gives all antiderivatives of -8/x^3, with C an arbitrary constant?

A. 4/x^4 + C
B. -4/x^2 + C
C. 8/x^2 + C
D. 4/x^2 + C

5. The definite integral of f from x = 2 to x = 8 is 27. What is the average value of f on that interval?

A. 3.375
B. 4.5
C. 6
D. 27

6. Estimate the definite integral of f(x) = x^2 + 1 from x = 0 to x = 6 using three equal-width rectangles and right endpoint heights. What estimate do you get?

A. 118
B. 46
C. 76
D. 59

7. A function satisfies F'(x) = 6x^2 - 4x + 1 and F(1) = 7. What is F(3)?

A. 43
B. 39
C. 46
D. 45

8. What is the definite integral of 6x times (3x^2 + 2)^2 from x = 0 to x = 1?

A. 13
B. 125/3
C. 39
D. 117

9. A graph joins (0, 1), (1, 3), (2.5, 2), and (4, 5) in order using straight line segments. What is the exact integral of the graphed function from x = 0 to x = 4?

A. 11
B. 9.5
C. 10
D. 12

10. What is the area between y = 2x and y = x^2 from x = 0 to x = 2?

A. 20/3 square units
B. 8/3 square units
C. 4 square units
D. 4/3 square units

11. Which is a general antiderivative of (x + 2)e^x, with C an arbitrary constant?

A. (x + 3)e^x + C
B. (x + 2)e^x + C
C. (x + 1)e^x + C
D. (x^2/2 + 2x)e^x + C

12. What is the value of the improper integral of 6/x^4 from x = 2 to infinity?

A. 1/2
B. 1/4
C. -1/4
D. It diverges

13. The average value of f(x) = a x^2 + 2 on [1, 3] is 9. What is the constant a?

A. 3/2
B. 7/13
C. 9/4
D. 21/13

14. For x from 0 to 4, a solid has square cross sections perpendicular to the x-axis. Each side length in units is 2 plus the square root of x. What is the volume?

A. 136/3 cubic units
B. 24 cubic units
C. 40/3 cubic units
D. 32 cubic units

15. What is the exact integral of 3/((x + 1)(x + 4)) from x = 0 to x = 3? Here ln denotes the natural logarithm.

A. ln(7/16)
B. ln(4/7)
C. ln(16/7)
D. ln(7/4)