

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find dy/dx .

1) $\int_0^{\sqrt{x}} 7t \cos(t^4) dt$

A) $7\sqrt{x} \sin(x^2)$

B) $7 \cos(x^2) - 7\sqrt{x} \sin(x^2)$

C) $\frac{7}{2} \cos(x^2)$

D) $7\sqrt{x} \cos(x^2)$

2) $\int_0^{x^4} \cos \sqrt{t} dt$

A) $\cos(x^2)$

B) $\sin(x^2)$

C) $4x^3 \cos(x^2)$

D) $\cos(x^2) - 1$

Evaluate the integral.

3) $\int_{-1}^4 (r+1)^2 dr$

A) $\frac{125}{3}$

B) $\frac{65}{3}$

C) $\frac{16}{3}$

D) $\frac{25}{3}$

4) $\int_{1/5}^6 \left(5 - \frac{1}{x}\right) dx$

A) $29 - \ln 1.2$

B) $29 - \ln 30$

C) $30 - \ln 30$

D) $29 - \ln 0.83333333$

5) $\int \frac{\sin t}{(4 + \cos t)^3} dt$

A) $\frac{2}{(4 + \cos t)^2} + C$

B) $\frac{1}{(4 + \cos t)^2} + C$

C) $\frac{1}{4(4 + \cos t)^4} + C$

D) $\frac{1}{2(4 + \cos t)^2} + C$

6) $\int x^4 \sqrt{x^5 + 3} dx$

A) $\frac{2}{15}(x^5 + 3)^{3/2} + C$

B) $-\frac{2}{5}(x^5 + 3)^{-1/2} + C$

C) $\frac{10}{3}(x^5 + 3)^{3/2} + C$

D) $\frac{2}{3}(x^5 + 3)^{3/2} + C$

7) $\int \sin(7x - 8) dx$

A) $-\frac{1}{7} \cos(7x - 8) + C$

B) $\frac{1}{7} \cos(7x - 8) + C$

C) $-\cos(7x - 8) + C$

D) $7 \cos(7x - 8) + C$

Solve the problem.

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

A) 18

B) 26

C) 52

D) 9

9) Suppose that $\int_1^x f(t) dt = 5x^2 + 6x - 3$. Find $f(x)$.

A) $\frac{5}{3}x^3 + \frac{5}{3}x^2 - 3x - 8$

B) $5x^2 + 6x - 3$

C) $10x + 6$

D) $\frac{5}{3}x^3 + 3x^2 - 3x$

10) Suppose that f and g are continuous and that $\int_7^{11} f(x) dx = -2$ and $\int_7^{11} g(x) dx = 10$.

Find $\int_7^{11} [5f(x) + g(x)] dx$.

A) 0

B) 40

C) 48

D) 15

11) How long will it take a sample of radioactive substance to decay to half of its original amount, if it decays according to the function $A(t) = 650e^{-.139t}$, where t is the time in years? Round your answer to the nearest hundredth year.

A) 4.99 years

B) 46.60 years

C) 51.58 years

D) 90.35 years

Evaluate the definite integral.

12) $\int_0^{\pi} 7 \sin x dx$

A) 2

B) 98

C) 7

D) 14

13) $\int_1^3 (2x^3 - 7x^{-2}) dx$

A) 35.33

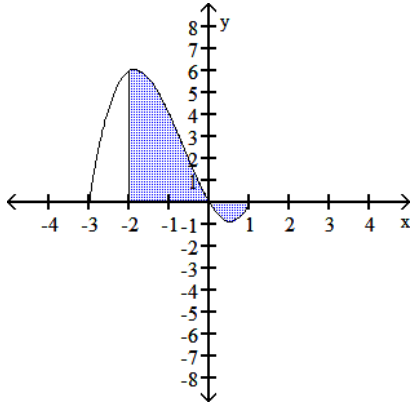
B) 54

C) 68

D) 49.83

Find the area of the shaded region.

14) $f(x) = x^3 + 2x^2 - 3x$, $g(x) = 0$



A) $-\frac{81}{12}$

B) $\frac{81}{12}$

C) $\frac{47}{12}$

D) $\frac{95}{12}$

Solve the initial value problem explicitly.

15) $\frac{dy}{dx} = 6x^2 - 4x + 19$; $y = 16$ when $x = 1$

A) $y = 6x^3 - 4x^2 + 19x - 5$

B) $y = 2x^3 - 2x^2 + 19x - 3$

C) $y = 2x^3 - 2x^2 + 19x + 3$

D) $y = 2x^3 - 4x^2 + 19x - 1$

16) $\frac{dy}{dx} = 3 \sec^2 x - \frac{1}{9\sqrt{x}}$ and $y = 5$ when $x = 0$

A) $y = 3 \tan x - \frac{2\sqrt{x}}{9} + 5$ for $0 \leq x < \pi$

B) $y = 3 \tan x \sec x - \frac{2\sqrt{x}}{9} + 5$ for $0 \leq x < \pi$

C) $y = 3 \tan x + \frac{2}{27x^{3/2}} + 5$ for $0 \leq x < \pi/2$

D) $y = 3 \tan x - \frac{2\sqrt{x}}{9} + 5$ for $0 \leq x < \pi/2$

Use areas to evaluate the integral.

17) $\int_a^{8a} x \, dx$, $a > 0$

A) $\frac{63}{2}a^2$

B) $63a^2$

C) $7a$

D) $8a^2$

Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis.

18) $y = \sqrt{7x}$, $y = 7$, $x = 0$

A) $\frac{343}{3}\pi$

B) $\frac{343}{4}\pi$

C) $\frac{343}{2}\pi$

D) 98π

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

19) $f(x) = x^2$, $a = 2$, $b = 6$

Use RRAM with four rectangles of equal width.

A) 86

B) 62

C) 69

D) 54

20) $f(x) = 16 - x^2$, $a = -4$, $b = 4$

Use MRAM with two rectangles of equal width.

A) 48

B) 8

C) 32

D) 96

Use the Trapezoidal Rule to estimate the integral.

21) $\int_1^4 f(x) dx$

x	1	2	3	4
f(x)	3.9	7.4	10.6	12.6

A) 33.65

B) 26.25

C) 28.75

D) 36.85

Find the average value over the given interval.

22) $y = \frac{15}{x}$; $[1, e]$

A) $\frac{15}{e-1}$

B) 0

C) $\frac{-15}{e-1}$

D) $\frac{-\frac{15}{2}e^2}{e-1}$

Express the desired quantity as a definite integral and evaluate the integral.

23) Find the output of a pump that produces 23 gallons per minute during the first 2 hours of its operation.

A) $\int_0^{120} 23 dt$, 2760 gal

B) $\int_0^2 23 dt$, 46 gal

C) $\int_0^{120} 23 dt$, 46 gal

D) $\int_0^{23} 120 dt$, 2760 gal

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

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

A) 3, -48

B) -3, -48

C) 3, -48

D) -3, -48

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

25) $\int_0^3 x^2 e^{2x} dx$

A) 1310.89

B) 100.61

C) 1815.18

D) 1311.14

Use separation of variables to solve the initial value problem.

26) $y' = 7xy$ and $y = -3$ when $x = 0$

A) $y = 3e^{7x}$

B) $y = -6e^{7x^2}$

C) $y = -3e^{\frac{7}{2}x^2}$

D) $y = 0$

Use NINT to solve the problem.

27) Evaluate $\int_{-0.6}^{0.6} \frac{3x^4 - 1}{x^4 - 1} dx$.

A) ≈ 3.600

B) ≈ -3.701

C) ≈ 1.133

D) ≈ -1.107

USE NINT to find the average value of the function on the interval. At what point in the interval does the function assume its average value?

28) $y = -3x^2 - 1, [0, 3]$

A) -28, at $x = 3$

B) 10, at $x = 1.73205081$

C) 28, at $x = 3$

D) -10, at $x = 1.73205081$

The function $v(t)$ is the velocity in m/sec of a particle moving along the x -axis. Determine when the particle is moving to the right, to the left, and stopped.

29) $v(t) = e \cos t \sin t, 0 \leq t \leq 2\pi$

A) Right: $0 < t < \pi$

Left: $\pi < t < 2\pi$

Stopped: $t = 0, \pi, 2\pi$

B) Right: $0 \leq t < \frac{\pi}{2}, \frac{3\pi}{2} < t \leq 2\pi$

Left: $\frac{\pi}{2} < t < \frac{3\pi}{2}$

Stopped: $t = \frac{\pi}{2}, \frac{3\pi}{2}$

C) Right: $0 < t \leq \pi$

Left: $\pi < t < 2\pi$

Stopped: $t = 0, 2\pi$

D) Right: $0 \leq t < \frac{\pi}{2}, \pi \leq t < \frac{3\pi}{2}$

Left: $\frac{\pi}{2} < t < \pi, \frac{3\pi}{2} < t < 2\pi$

Stopped: $t = \frac{\pi}{2}, \frac{3\pi}{2}$

Graph the integrand and use areas to evaluate the integral.

30) $\int_{-7}^7 (2x + 14) dx$

A) 98

B) 28

C) 392

D) 196

Answer Key

Testname: APCALC FINALREV

- 1) C
ID: CALC3DF 5.4.1-7
Objective: (5.4) Differentiate Integral
- 2) C
ID: CALC3DF 5.4.1-6
Objective: (5.4) Differentiate Integral
- 3) A
ID: CALC3DF 5.4.3-8
Objective: (5.4) Evaluate Definite Integral
- 4) B
ID: CALC3DF 5.4.3-1
Objective: (5.4) Evaluate Definite Integral
- 5) D
ID: CALC3DF 6.2.8-1
Objective: (6.2) Evaluate Integral by Substitution III
- 6) A
ID: CALC3DF 6.2.6-5
Objective: (6.2) Evaluate Integral by Substitution I
- 7) A
ID: CALC3DF 6.2.7-2
Objective: (6.2) Evaluate Integral by Substitution II
- 8) C
ID: CALC3DF 5.1.1-2
Objective: (5.1) Find Distance Traveled
- 9) C
ID: CALC3DF 5.4.7-1
Objective: (5.4) Know Concepts: Fundamental Theorem of Calculus
- 10) A
ID: CALC3DF 5.3.1-4
Objective: (5.3) Use Properties/ Known Values to Find Integral
- 11) A
ID: CALC3DF 6.4.4-3
Objective: (6.4) Solve Apps: Exponential Growth/Decay I
- 12) D
ID: CALC3DF 5.3.5-5
Objective: (5.3) Evaluate Definite Integral Using Antiderivative
- 13) A
ID: CALC3DF 5.3.5-4
Objective: (5.3) Evaluate Definite Integral Using Antiderivative
- 14) D
ID: CALC3DF 7.2.2-1
Objective: (7.2) Find Area Between Curves Given Graph II
- 15) B
ID: CALC3DF 6.1.2-2
Objective: (6.1) Solve Initial Value Problem
- 16) D
ID: CALC3DF 6.1.2-7
Objective: (6.1) Solve Initial Value Problem

Answer Key

Testname: APCALC FINALREV

17) A

ID: CALC3DF 5.2.3-3

Objective: (5.2) Use Area to Evaluate Definite Integral (Variable Bounds)

18) C

ID: CALC3DF 7.3.5-3

Objective: (7.3) Find Volume: Revolution About x-Axis (Washer Sections)

19) A

ID: CALC3DF 5.1.2-2

Objective: (5.1) Approximate Area Using RAM

20) D

ID: CALC3DF 5.1.2-5

Objective: (5.1) Approximate Area Using RAM

21) B

ID: CALC3DF 5.5.1-5

Objective: (5.5) Use Trapezoidal Rule

22) A

ID: CALC3DF 5.3.6-2

Objective: (5.3) Find Average Value Using Antiderivative

23) A

ID: CALC3DF 5.2.4-2

Objective: (5.2) Solve Apps: Distance, Flow

24) D

ID: CALC3DF 5.2.6-2

Objective: (5.2) Evaluate Integral of Discontinuous Function

25) A

ID: CALC3DF 5.2.5-3

Objective: (5.2) Tech: Evaluate Integral

26) C

ID: CALC3DF 6.4.1-6

Objective: (6.4) Solve Separable Differential Equation

27) C

ID: CALC3DF 5.4.6-5

Objective: (5.4) Tech: Evaluate Definite Integral

28) D

ID: CALC3DF 5.3.3-2

Objective: (5.3) Tech: Average Value

29) A

ID: CALC3DF 7.1.1-6

Objective: (7.1) Determine When Particle Is Moving to Right/Left/Stopped

30) D

ID: CALC3DF 5.2.2-3

Objective: (5.2) Use Area to Evaluate Definite Integral