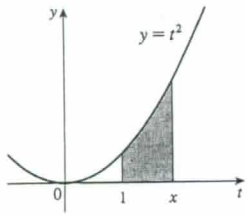
5.



(a), (b) x^2

7. $g'(x) = 1/(x^3 + 1)$

9. $g'(y) = y^2 \sin y$ **11.** $F'(x) = -\sqrt{1 + \sec x}$

13. $h'(x) = -\dfrac{\arctan(1/x)}{x^2}$ **15.** $y' = \sqrt{\tan x + \sqrt{\tan x}}\,\sec^2 x$

17. $y' = \dfrac{3(1 - 3x)^3}{1 + (1 - 3x)^2}$ **19.** $\frac{3}{4}$ **21.** 63

23. $\frac{5}{9}$ **25.** $\frac{7}{8}$ **27.** $\frac{156}{7}$ **29.** $\frac{40}{3}$ **31.** 1 **33.** $\frac{49}{3}$

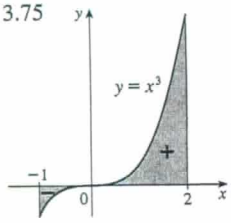
35. $\ln 3$ **37.** π **39.** $e^2 - 1$ **41.** 0

43. The function $f(x) = x^{-4}$ is not continuous on the interval $[-2, 1]$, so FTC2 cannot be applied.

45. The function $f(\theta) = \sec\theta \tan\theta$ is not continuous on the interval $[\pi/3, \pi]$, so FTC2 cannot be applied.

47. $\frac{243}{4}$ **49.** 2

51. 3.75

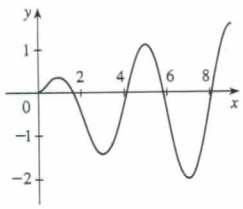


53. $g'(x) = \dfrac{-2(4x^2 - 1)}{4x^2 + 1} + \dfrac{3(9x^2 - 1)}{9x^2 + 1}$

55. $y' = 3x^{7/2}\sin(x^3) - \dfrac{\sin\sqrt{x}}{2\sqrt[4]{x}}$ **57.** $\sqrt{257}$ **59.** 29

61. (a) $-2\sqrt{n}, \sqrt{4n - 2}$, n an integer > 0
(b) $(0, 1), (-\sqrt{4n - 1}, -\sqrt{4n - 3})$, and $(\sqrt{4n - 1}, \sqrt{4n + 1})$, n an integer > 0 (c) 0.74

63. (a) Loc. max. at 1 and 5; loc. min. at 3 and 7
(b) $x = 9$
(c) $(\frac{1}{2}, 2), (4, 6), (8, 9)$
(d) See graph at right.



65. $\frac{1}{4}$ **73.** $f(x) = x^{3/2}, a = 9$

75. (b) Average expenditure over $[0, t]$; minimize average expenditure

EXERCISES 5.4 ▪ PAGE 397

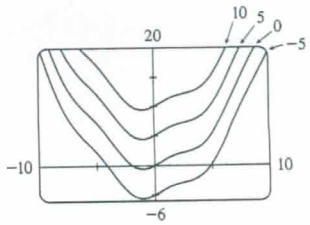
5. $\frac{1}{3}x^3 - (1/x) + C$ **7.** $\frac{1}{5}x^5 - \frac{1}{8}x^4 + \frac{1}{8}x^2 - 2x + C$

9. $2t - t^2 + \frac{1}{3}t^3 - \frac{1}{4}t^4 + C$ **11.** $\frac{1}{3}x^3 - 4\sqrt{x} + C$

13. $-\cos x + \cosh x + C$ **15.** $\frac{1}{2}\theta^2 + \csc\theta + C$

17. $\tan\alpha + C$

19. $\sin x + \frac{1}{4}x^2 + C$



21. 18 **23.** $-2 + 1/e$ **25.** 52

27. $\frac{256}{15}$ **29.** $-\frac{63}{4}$ **31.** $\frac{55}{63}$ **33.** $2\sqrt{5}$ **35.** 8

37. $1 + \pi/4$ **39.** $\frac{256}{5}$ **41.** $\pi/6$ **43.** -3.5

45. 0, 1.32; 0.84 **47.** $\frac{4}{3}$

49. The increase in the child's weight (in pounds) between the ages of 5 and 10

51. Number of gallons of oil leaked in the first 2 hours

53. Increase in revenue when production is increased from 1000 to 5000 units

55. Newton-meters (or joules) **57.** (a) $-\frac{3}{2}$ m (b) $\frac{41}{6}$ m

59. (a) $v(t) = \frac{1}{2}t^2 + 4t + 5$ m/s (b) $416\frac{2}{3}$ m

61. $46\frac{2}{3}$ kg **63.** 1.4 mi **65.** \$58,000

67. (b) At most 40%; $\frac{5}{36}$

EXERCISES 5.5 ▪ PAGE 406

1. $-e^{-x} + C$ **3.** $\frac{2}{9}(x^3 + 1)^{3/2} + C$ **5.** $-\frac{1}{4}\cos^4\theta + C$

7. $-\frac{1}{2}\cos(x^2) + C$ **9.** $\frac{1}{63}(3x - 2)^{21} + C$

11. $\frac{1}{3}(2x + x^2)^{3/2} + C$ **13.** $-\frac{1}{3}\ln|5 - 3x| + C$

15. $-(1/\pi)\cos\pi t + C$ **17.** $\frac{2}{3}\sqrt{3ax + bx^3} + C$

19. $\frac{1}{3}(\ln x)^3 + C$ **21.** $2\sin\sqrt{t} + C$ **23.** $\frac{1}{7}\sin^7\theta + C$

25. $\frac{2}{3}(1 + e^x)^{3/2} + C$ **27.** $\frac{1}{2}(1 + z^3)^{2/3} + C$ **29.** $e^{\tan x} + C$

31. $-1/(\sin x) + C$ **33.** $-\frac{2}{3}(\cot x)^{3/2} + C$

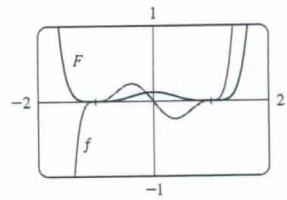
35. $-\ln(1 + \cos^2 x) + C$ **37.** $\ln|\sin x| + C$

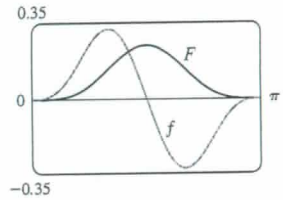
39. $\frac{1}{3}\sec^3 x + C$ **41.** $\ln|\sin^{-1}x| + C$

43. $\tan^{-1}x + \frac{1}{2}\ln(1 + x^2) + C$

45. $\frac{4}{7}(x + 2)^{7/4} - \frac{8}{3}(x + 2)^{3/4} + C$

47. $\frac{1}{8}(x^2 - 1)^4 + C$ **49.** $\frac{1}{4}\sin^4 x + C$





51. 0 **53.** $\frac{182}{9}$ **55.** 4

57. 0 **59.** $e - \sqrt{e}$ **61.** 3 **63.** $\frac{1}{3}(2\sqrt{2} - 1)a^3$

65. $\frac{16}{15}$ **67.** 2 **69.** $\ln(e + 1)$ **71.** $\sqrt{3} - \frac{1}{3}$

73. 6π **75.** All three areas are equal. **77.** ≈ 4512 L

79. $\dfrac{5}{4\pi}\left(1 - \cos\dfrac{2\pi t}{5}\right)$ L **81.** 5 **87.** $\pi^2/4$

CHAPTER 5 REVIEW ▪ PAGE 409

True-False Quiz

1. True **3.** True **5.** False **7.** True **9.** True

11. False **13.** False **15.** False