Appendix (2): Answers to Exercises

➤ Chapter One:

Exercise 1-1

1. $2\sqrt{x}+c$
2. $-\frac{4}{\sqrt[4]{x}}+c$
3. $-\cot x+c$
4. $-\tan x+c$
5. $\frac{5}{4}x^{\frac{4}{5}}+c$
6. $\sec x+c$
7. $-\frac{2}{3\sqrt{x^3}}+c$
8. $-\cos x+c$

Exercise 1-2

1. $\frac{2}{7}x^{\frac{7}{2}}+c$
2. $\frac{4}{7}x^{\frac{7}{4}}+\frac{x^3}{3}+x+c$
3. $\frac{x^5}{5}+\frac{2}{3}x^3+\frac{x^2}{2}+c$
4. $\frac{x^3}{3}+\tan x+c$
5. $-\cot x-\frac{2}{3}x^{\frac{3}{2}}+c$
6. $3x-4\cot x+c$
7. $\frac{-1}{x}+\frac{1}{3x^3}+c$
8. $\frac{20}{7}x^{\frac{7}{5}}-\frac{6}{5}x^{\frac{5}{3}}+\frac{1}{2}x^2+c$
9. $x-\frac{3}{2x^2}-\frac{2}{3x^3}+c$
10. $\frac{3}{8}x^{\frac{8}{3}}+\frac{3}{5}x^{\frac{5}{3}}+\frac{3}{4}x^{\frac{4}{3}}+c$
11. $\sqrt{\cos^3 x+1}$
12. $\sqrt{\cos^3 x+1}+c$
13. $f(x)=x^4+x^2+x+1$
14. $f(x)=-\sin x-2\cos x+4x+3$
15. $f(x)=\frac{2}{3}x^{\frac{3}{2}}$
16. $f(x)=\sin x+1$
17. $f(x)=\tan x-1$

Exercise 1-3

1. $\frac{(1+x^2)^{\frac{3}{2}}}{3}+c$
2. $\frac{2}{5}(x-1)^{\frac{5}{2}}+\frac{2}{3}(x-1)^{\frac{3}{2}}+c$
3. $\frac{2}{7}(x-1)^{\frac{7}{2}}+\frac{4}{5}(x-1)^{\frac{5}{2}}+\frac{2}{3}(x-1)^{\frac{3}{2}}+c$
4. $\frac{\tan^2 x}{2}+c$
5. $\frac{\sin^6 x}{6}+c$
6. $\frac{1}{2}(2x^2+1)^{\frac{1}{2}}+c$
7. $-\frac{2}{3}(1-\sin t)^{\frac{3}{2}}+c$
8. $-\frac{\cos^4 x}{4}+c$
9. $\frac{1}{3}\sin(3x+4)+c$
10. $\frac{-2}{\sqrt{x+1}}+c$
11. $\frac{1}{4}\sec 4x+c$
12. $-\frac{2}{3}\cot^{\frac{3}{2}}x+c$
13. $-\frac{1}{2}(1+\frac{1}{t})^2+c$
14. $\frac{(2x-1)^{\frac{3}{2}}}{6}+\frac{(2x-1)^{\frac{1}{2}}}{2}+c$
15. $\frac{(4x^3-6)^8}{96}+c$
16. $\frac{1}{9}\sin^3(3x)+c$

Review Exercises

1. x^2+c
2. x^3+x+c
3. $\frac{x^4}{8}+\frac{x^2}{2}+c$
4. $\frac{x^5}{5}+\frac{x^4}{4}+c$
5. $\frac{x^3}{3}+\frac{3}{2}x^2-x+c$
6. $x-x^2-\frac{5}{4}x^4+c$
7. $\frac{-1}{x}+c$
8. $\frac{2}{7}x^{\frac{7}{2}}+c$
9. $\frac{-2}{\sqrt{x}}+c$
10. $\frac{x^3}{3}-x+c$
11. $\frac{x^4}{2}-2x^{\frac{3}{2}}-\frac{1}{x^4}+c$
12. $\frac{5(1+x)^{\frac{6}{5}}}{6}+c$
13. $\frac{x^5}{5}-\frac{x^4}{4}+\frac{x^2}{2}-x+c$
14. $\frac{x^2}{2}+x+c$
15. $\frac{2}{3}x^{\frac{3}{2}}-6x^{\frac{1}{2}}+c$
16. $\frac{3}{5}x^{\frac{5}{3}}+\frac{3}{2}x^{\frac{2}{3}}+c$
17. $\frac{x^7}{7}-\frac{x^4}{2}+x+c$
18. $-\cos x+x+c$
19. $\sin x-\frac{x^2}{2}+c$
20. $\tan x-4x+c$
21. $\sec x+\frac{x^2}{2}+c$
22. $-\cot x+\frac{x^3}{3}+x+c$
23. $\tan x+c$
24. $-\cot x+c$
25. $\sec x+c$
26. $\sec x-\tan x+c$
27. $\tan x+x+c$
28. $-\csc x+c$
29. $\frac{\tan^2 x}{2}+c$
30. $\sec x+c$
31. $-\csc x+c$
32. $\tan x+2\sec x+c$
33. $-cotx-3\csc x+c$
34. $\frac{-2}{5}\cos^{\frac{5}{2}}x+c$

35. $\frac{(3x^5+1)^{11}}{165}+c$
36. $\frac{(x^2+1)^{\frac{3}{2}}}{3}+c$
37. $\frac{2}{3}(x^2+x+2)^{\frac{3}{2}}+c$
38. $\frac{(x^3-3x+2)^{\frac{4}{3}}}{4}+c$
39. $\frac{(5x^2+2x-5)^4}{8}+c$
40. $-2\cos\sqrt{x}+c$
41. $2\tan\sqrt{x}-2\sqrt{x}+c$
42. $-2\cot\sqrt{x}-2\sqrt{x}+c$
43. $\frac{1}{2}\sec 2x+c$
44. $-2\csc\sqrt{x}+c$
45. $-\frac{1}{2}\cos x^2+c$
46. $\frac{1}{2}\tan x^2+c$
47. $-\frac{1}{2}\cot(x^2+x-1)+c$
48. $-3\cot\sqrt[3]{x}$
49. $5\tan(\sqrt[5]{x}+1)+c$
50. $\sqrt{x^2+9}+c$
51. $\frac{3}{4}(x^2-1)^{\frac{2}{3}}+c$
52. $-\frac{\cos^3 x}{3}+c$
53. $\sin^2\sqrt{x}+c$
54. $-\frac{1}{2}\cos^4\sqrt{x}+c$
55. $-2\cot x-\csc x+c$
56. $\frac{4}{9}(x+1)^{\frac{9}{4}}-\frac{5}{4}(x+1)^{\frac{4}{5}}+c$
57. $\frac{2}{5}(x-3)^{\frac{5}{2}}+2(x-3)^{\frac{3}{2}}+c$
58. $-\frac{1}{(\sqrt{x}+1)^2}+c$
59. $\sqrt{4x-x^2}+c$
60. $-\frac{\cos^3 x}{3}-\cos x+c$
61. $\frac{1}{4(5+\cos 2x)^2}+c$
62. $\frac{1}{2}\sqrt{x^4-1}+c$
63. $\frac{2}{3}x^{\frac{3}{2}}+c$
64. $3\sec\sqrt[3]{x}+c$
65. (a)
66. (c)
67. (d)
68. (a)
69. (d)
70. (c)

➤ Chapter Two:

Exercise 2-3

1. 9
2. 55
3. $\frac{163}{60}$
4. 275
5. 120
6. 11
7. $\frac{n(n-1)}{2}$
8. $\frac{2n^3+3n^2+7n}{6}$
9. $\frac{n\left[(n+1)\left(3n^2+11n-2\right)+12\right]}{12}$

Exercise 2-2

1. 2.7
2. 1.5
3. 3
4. 2.3
6. 2.1
7. 2.1
8. 0.5
9. $\frac{\pi}{4}$
9. $P=\{0,\frac{3}{5},\frac{6}{5},\frac{9}{5},\frac{12}{5},3\}$
10. $P=\{-1,\frac{-1}{6},\frac{2}{3},\frac{3}{2},\frac{7}{3},\frac{19}{6},4\}$
11. $P=\{-4,-3,-2,-1,0,1,2,3,4\}$
12. $P=\{0,\frac{1}{4},\frac{1}{2},\frac{3}{4},1\}$
13. $R_P=15$
14. $R_P=39$
15. $R_P=24.5$
16. $A=\frac{1}{2}$
17. $A=\frac{3}{2}$
18. $A=\frac{28}{3}$
19. $A=60$

Exercise 2-3

1. 35
2. 0
7. 11
8. -5
9. 0
10. -4

Exercise 2-4

1. $\frac{21}{2}$
2. $\frac{8}{3}$
3. $10(4\sqrt{10}+1)$
4. $4(\sqrt{2}-1)$
5. 0
6. 1
7. $1+\sqrt{3}-\sqrt{2}$
8. $\frac{1}{\sqrt{3}}$
9. $\sqrt[3]{2}-1$
10. $\sqrt[3]{-2}$
11. $\frac{\sqrt{14}}{3}$
12. $\frac{9}{4}$
13. $\sin^{-1}(\frac{2}{\pi})$
14. $\cos^{-1}(\frac{2}{\pi})$
15. $\frac{7}{3}$
16. 1
17. $\frac{10}{3}$
18. $\frac{3}{16}(3\sqrt[3]{3}-1)$

19. $\frac{3}{25}$
20. $\frac{-3}{\pi}(\sqrt{3}-2)$
21. $\sqrt{\sin x+1}\cos x+\sqrt{\cos x+1}\sin x$
22. $\frac{1}{2\sqrt{x}(x+1)}-\frac{1}{x^2+1}$
23. $x-1$
24. $\frac{3}{3x-4}-\frac{1}{x}$
25. $\cos x\int_1^x \sqrt{t}\,dt+\sqrt{x}\sin x$
26. $\sin(x+1)+2\sin(-2x+1)$
27. $-\frac{3x^2}{x^{12}+1}$
28. $\sqrt{1+\sec^4 x}\,\sec x\tan x-\sqrt{1+\tan^4 x}\,\sec^2 x$
29. $F(2)=0 \quad F'(2)=\sqrt{13} \quad F''(2)=\frac{6}{\sqrt{13}}$
30. $G(0)=0 \quad G'(0)=0 \quad G''(0)=-1$
31. $H'(2)=4\sqrt[5]{5}-\sqrt[5]{3}$
32. $F(0)=0 \quad F'(0)=0$

Exercise 2-5

1. 2.3251, $|E_T|\leq 0.0147$
2. 3.446, $|E_T|\leq 0.0024$
3. 2.317, $|E_T|\leq 0.0053$
4. 1.8961, $|E_T|\leq 0$
5. 0.6933, $|E_S|< 5\times 10^{-4}$
6. 0.4407, $|E_S|< 0.0147$
7. 3.241, $|E_S|< 0.0147$
8. 1.515, $|E_S|< 0.0147$
9. $n=99$
10. $n=4$

Review Exercises

1. $\frac{n(n-1)}{2}$
2. $n(n+2)$
3. $\frac{n\left(2(n^2-1)+6\right)}{6}$
4. $\frac{n\left((n+1)(n+5)+4\right)}{4}$
5. 24
6. 1.45
7. 26
8. 14
9. 2
10. 1.5
11. 1.5
12. 1.55
13. a. 20 b. 25 c. 22.5
14. a. 3 b. 10.5 c. 6.75
15. a. 20.375 b. 27.875 c. 23.9375
16. a. -164 b. -512 c. -299
17. 10
18. $5/2$
19. $2/3$
20. $28/3$
21. 3
22. 8
23. $A_{IP}=9.5 \quad A_{CP}=10.5 \quad A=10$
24. $A_{IP}=2.75 \quad A_{CP}=2.25 \quad A=2.5$
25. $A_{IP}=0.75 \quad A_{CP}=0.75 \quad A=0.67$
26. $A_{IP}=8.5 \quad A_{CP}=10.5 \quad A=28/3$
27. $A_{IP}=2.75 \quad A_{CP}=3.25 \quad A=3$
28. $A_{IP}=5.75 \quad A_{CP}=10.75 \quad A=8$
29. 12
30. $\frac{5}{2}$
31. $\frac{275}{6}$
32. 0
33. $\frac{-11}{20}$
34. 0
35. $\frac{17}{2}$
36. $\frac{9}{2}$
37. $\frac{2}{3}$
38. 0
39. 1
40. -2
41. 0
42. 2.0414
43. -2
44. 4
45. 7
46. -1
47. $\frac{65}{3}$
48. 0
49. 7
50. 6
51. $\frac{-1}{3}$
52. $\frac{9}{4}$
53. 16
54. $\frac{4}{\sqrt{3}}$
55. $\sqrt[3]{5}$
56. 4
57. $\sqrt[3]{\frac{15}{4}}$
58. $\sin\sqrt{x}$
59. $\frac{1}{x}$
60. $3x^2\sin(x^9+1)^{10}-3\sin(27x^3+1)^{10}$
61. $\frac{1}{x^2+2x+2}$
62. $\cos x^2+\cos(\cos^2 x)\sin x$
63. $\sqrt{x^2+1}$
64. $-6\sqrt{12x+2}$
65. $\frac{\tan x}{2\sqrt{x}}$
66. 162
67. 0.6938
68. 1.73
69. 6.244

70. 2.4053
71. 0.9840
72. 4.675
73. 1.249
74. 190
75. 1897
76. 80
77. 800
78. *d*
79. *d*
80. *c*
81. *a*
82. *a*
83. *b*
84. *c*
85. *c*
76. *d*
77. *c*
78. *c*
79. *b*
80. *d*
81. *c*
82. *b*
83. *d*
84. *a*
85. *b*
86. *b*
87. *d*
88. *a*
89. *d*
90. *c*

➤ Chapter Three:

Exercise 3-1

1. $\frac{1}{x+1}$
2. $\frac{3x^2+2}{x^3+2x-4}$
3. $\frac{1}{2x}$
4. $\frac{2}{3x}$
5. $\frac{-1}{x}$
6. $\frac{\cos x+1}{\sin x+x+1}$
7. $\frac{\sec x\tan x+2}{\sec x+x^2}$
8. $-2\tan x$
9. $2\cot x$
10. $2\tan x+\cot x$
11. $-\csc x\ \cot x\ \ln x+\frac{\csc x}{x}$
12. $\frac{2\ln(x^3+1)}{3\sqrt[3]{x}}+\frac{3x^2\sqrt[3]{x^2}}{x^3+1}$
13. $\frac{x}{x^2-1}-\frac{1}{2(x+2)}$
14. $\frac{2x}{x^2+1}+\frac{1}{x-1}$
15. $-\frac{1}{2\sqrt{x(x+1)}}$
16. $\frac{\ln x^2-2}{(\ln x^2)^2}$
17. $\frac{3x^2}{x^3+1}$
18. $\frac{2\tan x}{\ln\cos^2 x}$
19. $\frac{1}{5}\left[\frac{2}{2x+1}-\frac{3}{3x-1}\right]\sqrt[5]{\frac{2x+1}{3x-1}}$
20. $\left[\frac{1}{x-1}+\frac{3x^2+2}{2(x^3+2x+1)}-\frac{3x^2+4x+1}{x^3+2x^2+x-1}\right]\frac{(x-1)(\sqrt{x^3+2x+1})}{x^3+2x^2+x-1}$
21. $\left[\frac{2}{x}+\frac{7}{2(7x+3)}-\frac{6x}{3(1+x^2)}\right]\frac{x^2\sqrt{7x+3}}{(1+x^2)^3}$
22. $\frac{1}{3}\left[\frac{2}{\cos x\sin x}+\cot x-\tan x-\frac{3}{2x}\right]\sqrt[3]{\frac{\tan^2 x\sin x\cos x}{\sqrt{x^3}}}$
23. $\frac{7}{2}\left[\frac{1-x}{2x(x+1)}+2x\tan x^2\right](\frac{x\sec x^2}{\sqrt{x}(x+1)})^{\frac{7}{2}}$
24. $\left[\frac{1}{3(x+1)}-2\tan x+3\tan 3x-\frac{2}{x+1}\right]\frac{\sqrt[3]{x+1}\cos^2 x}{(x+1)^2\cos(3x)}$
25. $\frac{3}{2}\ln(x^2+1)+c$
26. $\ln\sqrt{3}$
27. $\frac{1}{2}\ln(x^2)+c$
28. $\ln|\sec x+\tan x|+c$
29. $-\ln|1+\cot x|+c$
30. $\frac{1}{2}\left[\ln 17-\ln 2\right]$
31. $-\ln|\csc x+\cot x|+c$
32. $2\sin\sqrt{x+1}+c$
33. $\frac{(\ln x^2)^{\frac{3}{2}}}{3}+c$
34. $\ln 2+\frac{3}{2}$
35. $\sin(\ln x)+c$
36. $-\frac{1}{4}\left[\frac{1}{(\ln 3)^4}-\frac{1}{(\ln 2)^4}\right]$

Exercise 3-2

1. 1
2. $\sqrt[5]{x}$
3. x^2-4
4. $3+\ln x^2$
5. $x=\pm\sqrt{e^4}$
6. $x=e^e$
7. $x=\sqrt{27}$
8. $x=1$ and $x=-3$
9. $e^{\sin x-3x^2}(\cos x-6x)$

10. $e^x\sqrt{x}\left[1+\frac{3x\sqrt{x}}{2}\right]$
11. $e^x\cos(\ln x)-\frac{e^x\sin(\ln x)}{x}$
12. $\frac{e^{\frac{1}{x}}(x-\ln x)}{x^2}$
13. $\frac{e^{-x}(4\sqrt{x}-1)}{2\sqrt{x}(e^{-x}+\sqrt{x}e^{-x})}$
14. $\cos x e^{\sqrt[3]{x}}+\frac{e^{\sqrt[3]{x}}\sin(x)}{3x^{2/3}}$
15. $\frac{e^x\sec^2(e^x)}{\tan e^x}$
16. $\frac{\sqrt{e^x}}{2}$
17. $\frac{1+2e^x}{2\sqrt{e^{-x}+1}}$
18. $6e^{3x}\sec^2(e^{3x})\tan(e^{3x})$
19. $\frac{e}{2}(e^2-1)$
20. $2e^{\sqrt{x}}+c$
21. $e^{\sin x}+c$
22. $2e^{\sqrt{x}+\cos x}+c$
23. $-e^{\frac{1}{x}}+c$
24. $\sqrt{2}-1$
25. $-2e^{-\sqrt{x}}+c$
26. $-\frac{1}{4(1+e^x)^4}+c$
27. $\sin x+c$
28. $\ln(e^2+1)-\ln(e+1)$

Exercise 3-3

1. $3^x\ln 3$
2. $2^{\sin x\cos x}\left(\cos^2 x-\sin^2 x\right)$
3. $\ln 2$
4. $\frac{-\tan x}{\ln 2}$
5. $\frac{1}{3\ln 10\ (x+1)}$
6. $5^{\sqrt{x}\tan x}\left(\frac{\tan x}{2\sqrt{x}}+\sqrt{x}\sec^2 x\right)$
7. $4^{-2x}-2\ln(4)\ x\ 4^{-2x}$
8. $\frac{1}{\ln 10\ (x+1)}$
9. $\tan 5^{x+1}\ (5^{x+1}\ln 5)$
10. $\frac{3x^{1/2}}{2\ln(5)\ x^{3/2}}$
11. $\left(\ln\sin x+x\cot x\right)(\sin x)^x$
12. $\left(\ln e^x+x\right)(e^x)^x$
13. $\left(e^x\ln x+\frac{e^x}{x}\right)x^{e^x}$
14. $\left(\frac{\ln(x^2-x)}{x}+\frac{(2x-1)\ln x}{x^2-x}\right)(x^2-x)^{\ln x}$
15. $\frac{1}{3\ln 5}\ 5^{x^3}+c$
16. $\frac{1}{\ln 2}\ \sin(2^x+1)+c$
17. $\frac{\ln(10)}{2}\ln|\log x^2|+c$
18. $\frac{2\sqrt{3^x+1}}{\ln 3}+c$
19. $\frac{2}{9\ln 7}(7^{3x}+1)^{\frac{3}{2}}+c$
20. $\frac{\ln 2}{2}(\log_2\sin x)^2+c$

Review Exercises

1. $x=2$
2. $x=e$
3. $x=3/64$
4. $x=\pm 2\sqrt{2}$
5. $x=(1+\sqrt{5})/2$
6. $x=\ln 2$
7. 0
8. 0
9. 1
10. ∞
11. ∞
12. $-\infty$
13. $\frac{2}{x}$
14. $\frac{2x+3}{x^2+3x+1}$
15. $-3\tan x$
16. $2x\cot x^2$
17. $\frac{3x^2+1}{2(x^3+x-1)}$
18. $-\frac{1}{2\sqrt{x(x-1)}}$
19. $\cos x\ln(\cos x)-\frac{\sin^2 x}{\cos x}$
20. $\frac{2}{x}+\cot x-\frac{1}{2(x+1)}$
21. $-\frac{1}{x}\left[\frac{1}{(\ln x)^2}+1\right]$
22. $\frac{6\ln x^3}{x}$
23. $\frac{\ln(x^2+x-2)}{2\sqrt{x}}+\frac{(2x+1)\sqrt{x}}{x^2+x-2}$
24. $e^x\sec x(1+\tan x)$
25. $(2x+1)$
26. $e^{x+1}\sin^2 x\left[3\cos x+\sin x\right]$
27. $\frac{1}{(x+1)^2}\ e^{\frac{x}{x+1}}$

28. $e^x \cot e^x$
29. $2e^{2x+1}$
30. $e^{\sin x}\cos x$
31. $2\sec^2 x\ \tan x\ e^{\sec^2 x}$
32. $(6x^2+1)\ e^{2x^3+x-1}\ \cos(e^{2x^3+x-1})$
33. $2e^{2x+1}$
34. $\frac{xe^x}{(x+1)^2}$
35. $\frac{e^x(x\ \ln x-1)}{x\ (\ln x)^2}$
36. $e^{x\tan x}\big(\tan x + x\sec^2 x\big)$
37. $e^x \ln x + \frac{e^x}{x}$
38. $\frac{xe^{\sqrt{x}}}{2}(4+\sqrt{x})$
39. $-\pi^{\cos x}\sin x\ \ln \pi$
40. $2^{\sin^2 x}\ln(2)\big(2\sin x\cos x\big)$
41. $3\ \ln(10)\ 10^{3x}$
42. $\sec^2(2^{\sin x})\big[2^{\sin x}\ \cos x\ \ln 2\big]$
43. $\frac{1}{\ln 3}\big(\frac{6}{6x+1}-\frac{2}{2x-1}\big)$
44. $\frac{1}{10x\ln x}$
45. $\sec^2 x\ \Big[\ln\tan x+1\Big](\tan x)^{\tan x}$
46. $\Big[\ln x+1\Big]x^x$
47. $\Big[\frac{\ln x+2}{2\sqrt{x}}\Big]x^{\sqrt{x}}$
48. $4(\ln x+1)x^{4x}$
49. $\Big[\cos x\ln x+\frac{\sin x}{x}\Big]x^{\sin x}$
50. $\Big[\sec^2 x\ \ln x+\frac{\tan x}{x}\Big](\ln x)^{\tan x}$
51. $\frac{1}{3}\ln\mid x^3+2\mid +c$
52. $-\ln\mid \cos x\mid +c$
53. $\frac{1}{2}\ln\mid x^2+2x\mid +c$
54. $\frac{2(\ln x)^{3/2}}{3}+c$
55. $\ln\sqrt{2}$
56. $\frac{1}{2}(\ln 3-\ln 7)$
57. $\sin(\ln x)$
58. $\frac{x^2}{2}+2x+\ln|x|+c$
59. $\frac{-1}{\ln x}+c$
60. $-\ln\mid \sin x+\cos x\mid +c$
61. $-\frac{1}{2\ln 3}3^{-x^2}+c$
62. $e^{x^2}+c$
63. $\ln\mid e^x-e^{-x}\mid +c$
64. $\sin x+c$
65. $e^{\tan x}+c$
66. $\frac{2}{\ln 5}\ 5^{\sqrt{x}}+c$
67. $-\frac{5}{2}$
68. $\frac{1}{4}\ln\mid x^4+1\mid +c$
69. $\frac{4^{3x}}{6\ln 2}+c$
70. $\frac{1}{-2\ln 3}\big(\frac{1}{3^9}-1\big)$
71. $\frac{1}{2\ln 10}10^{x^2+1}+c$
72. $\frac{2a^{\sqrt{x+1}}}{\ln a}$
73. b
74. c
75. a
76. b
77. c
78. d
79. a
80. a
81. b
82. b
83. c
84. a
85. a
86. c
87. a
88. a
89. a

➤ **Chapter Four: Exercise 4-1**

1. $\frac{1}{x\sqrt{1-(\ln x)^2}}$
2. $\frac{-8x}{\sqrt{1-16x^4}}$
3. $\frac{1}{2\sqrt{x}(x+1)}$
4. $\frac{1}{|x|\sqrt{\frac{25}{9}x^2-1}}$
5. $\frac{2x+1}{\sqrt{1-(x^2+x-1)^2}}$
6. $\frac{-1}{1+x^2}$
7. $\frac{e^{\frac{1}{x}}}{x^2\big(e^{\frac{2}{x}}+1\big)}$
8. $\frac{1}{3x\mid\ln(\sqrt[3]{x})\mid\sqrt{(\ln\sqrt[3]{x})^2-1}}$
9. $\sin^{-1}\big(\frac{x}{3}\big)+c$

10. $\frac{1}{9}\tan^{-1}(\frac{x}{9})+c$
11. $\frac{1}{2}\sec^{-1}(\frac{e^x}{2})+c$
12. $\tan^{-1}(\sin x)+c$
13. $\frac{1}{12}\sec^{-1}(\frac{x^4}{3})+c$
14. $\tan^{-1}(e^x)+c$
15. $\sin^{-1}(\ln x)+c$
16. $\frac{1}{\sqrt{3}}\sec^{-1}(\frac{\tan x}{\sqrt{3}})+c$

Exercise 4-2

1. $\frac{3}{2}\sqrt{x}\cosh(\sqrt{x^3})$
2. $5sech^2(5x)$
3. $-e^{-x}\cosh x+e^{-x}\sinh x$
4. $2e^{\sinh(2x)}\cosh(2x)$
5. $\frac{-\text{csch}^2 x}{\coth x}$
6. $-\frac{1}{2}\sqrt{\text{csch}x}\coth x$
7. $\cosh(\tan x)\sec^2 x$
8. $\frac{e^{\sqrt{x}}\sinh(e^{\sqrt{x}})}{2\sqrt{x}}$
9. $\frac{sech^2(\ln x)}{x}$
10. $\text{csch}x\left[\frac{1-2(x+1)\coth x}{2\sqrt{x+1}}\right]$
11. $2\cosh(\sqrt{x})+c$
12. $\sinh(\ln x)+c$
13. $\ln(\cosh(e^x))+c$
14. $\frac{(1+\tanh x)^4}{4}+c$
15. $e^{\sinh x}+c$
16. $-\ln(1+sechx)+c$
17. $\frac{2(3+\cosh x)^{3/2}}{3}+c$
18. $2\big(-sech\sqrt{x}+\ln(\cosh\sqrt{x})\big)+c$
19. $\ln|\tanh x|+c$
20. $\frac{-\ln(\coth x)^2}{2}+c$

Exercise 4-3

1. $\sec x$
3. $\frac{e^{\sqrt{x}}}{2\sqrt{x(e^{2\sqrt{x}}-1)}}$
4. $\frac{1}{x(1-(\ln x)^2)}$
5. $\frac{\text{csch}^{-1}x}{2\sqrt{x+1}}+\frac{-\sqrt{x+1}}{|x|\sqrt{x^2+1}}$
6. $\sec^2 x\tanh^{-1}x+\frac{\tan x}{1-x^2}$
7. $6(2x-1)^2\sinh^{-1}(\sqrt{x})+\frac{(2x-1)^3}{2\sqrt{x(x+1)}}$
8. $\frac{1}{\sqrt{2}}\cosh^{-1}x+c$
9. $\tanh^{-1}(e^x)+c$
10. $\frac{-1}{2}sech^{-1}x^2+c$
11. $\sinh^{-1}(\frac{x}{5})+c$
12. $\cosh^{-1}(\frac{x}{5})+c$
13. $\tanh^{-1}(\sin x)+c$
14. $-\frac{1}{3\sqrt{2}}\text{csch}^{-1}(\frac{|x^3|}{\sqrt{2}})+c$
15. $-\frac{1}{2}sech^{-1}(\frac{e^x}{2})+c$

Review Exercises

1. $\frac{3}{\sqrt{1-(3x+1)^2}}$
2. $\frac{-1}{2\sqrt{x(1-x)}}$
3. $\frac{2}{3+4x^2/3}$
4. $\frac{1}{|x|\sqrt{9x^2-1}}$
5. $4\cosh(4x+1)$
6. $e^x\sinh(e^x)$
7. $\frac{1}{2\sqrt{x}}\tanh(\sqrt{x})+\frac{sech^2(\sqrt{x})}{2}$
8. $e^{3x}\big[3\cosh(2x)+2\sinh(2x)\big]$
9. $\frac{3\cosh(3x)+5\sinh(5x)}{2\sqrt{\sinh(3x)+\cosh(5x)}}$
10. $sechx$
11. $e^x\cosh(\cosh x)+e^x\sinh(\cosh x)\sinh x$
12. $sech^2 x$
13. $\frac{-1}{|x|\sqrt{1-9x^2}}$
14. $\frac{1}{2\sqrt{x}(1-x)}$
15. $4x^3\cosh^{-1}x+\frac{x^4}{\sqrt{x^2-1}}$

16. $e^x \tanh^{-1}(\sqrt[3]{x}) + \frac{e^x}{3(x^{\frac{2}{3}} - x^{\frac{4}{3}})}$
17. $sechx$
18. $-\frac{1}{2x}$
19. 0
20. ∞
21. ∞
22. 1
23. $\frac{\sinh^4 x}{4} + c$
24. $\frac{\tanh^5 x}{5} + c$
25. $e^{\sinh x} + c$
26. $\frac{1}{2}\ln \mid e^{2x} - 1 \mid + c$
27. $2\sinh(\sqrt{x}) + c$
28. $-\frac{1}{2} sech x^2 + c$
29. $\frac{1}{3}\sinh 3x + c$
30. $\ln \mid \cosh x \mid + c$
31. $\frac{1}{\sqrt{3}} \tan^{-1}(\frac{x}{\sqrt{3}}) + c$
32. $\frac{1}{4}\sec^{-1}(\frac{x^2}{2}) + c$
33. $\sec^{-1}(e^x) + c$
34. $-\sqrt{4 - x^2} - \sin^{-1}(\frac{x}{2}) + c$
35. $\sin^{-1}(\frac{x}{3}) - \frac{1}{5} sech^{-1}(\frac{|x|}{5}) + c$
36. $\frac{1}{16}\sec^{-1}(\frac{x^4}{4}) + c$
37. $\frac{1}{2}\sinh^{-1}(2x) + c$
38. $\frac{1}{6}\tanh^{-1}(\frac{3x}{2}) + c$
39. $-\frac{1}{8}\left[\coth^{-1}(16) - \coth^{-1}(4)\right]$
40. $\cosh^{-1}(3) - \cosh^{-1}(2)$
41. $\frac{1}{3}\sinh^{-1}(\frac{3x}{5}) + c$
42. $\frac{1}{4}\sec^{-1}(\frac{e^x}{4}) + c$
43. a
44. a
45. a
46. c
47. b
48. b
49. c
50. c
51. d
52. c
53. c
54. a
55. d

➤ Chapter Five:

Exercise 5-1

1. $\frac{x^4}{4}(\ln x - \frac{1}{4}) + c$
2. $-\frac{1}{2}(\ln\frac{1}{2} + 1)$
3. $\sqrt{1 - x^2} + x\sin^{-1} x + c$
4. $\frac{1}{5}(4 - x^2)^{5/2} - \frac{4}{3}(4 - x^2)^{3/2} + c$
5. $\sin x - x\cos x + c$
6. $(x^2 - 2)\sin x + 2x\cos x + c$
7. $\frac{e^x}{5}\big(\sin(2x) - 2\cos(2x)\big) + c$
8. $\frac{\pi}{4} - \frac{\ln 2}{2}$
9. $\frac{e^{2x}}{5}(\sin x + 2\cos x) + c$
10. $x\big((\ln^2 x - 2)\ln x + 2\big) + c$
11. $-\frac{\ln(x)}{x} - \frac{1}{x} + c$
12. $\frac{\sin 2x - 2x\cos 2x}{8} + c$
13. $-\frac{1}{2\ln^2 x} + c$
14. $e - 2$
15. $\frac{(x^2+1)\tan^{-1} x - x}{2} + c$
16. $-(x + 1)e^{-x} + c$

Exercise 5-2

1. $\frac{1}{8}\sin^3 x\cos^5 x + \frac{5}{8}\big(\frac{x}{16} - \frac{1}{64}\sin 4x\big) + \frac{1}{6}\sin^3 x\cos^3 x + c$
2. $-\frac{1}{7}\cos^7 x + \frac{2}{5}\cos^5 x - \frac{1}{3}\cos^3 x + c$
3. $\frac{1}{6}\cos^6 x - \frac{1}{4}\cos^4 x + c$
4. $\frac{1}{24}\sin 4x\cos^5 4x + \frac{5}{24}\big(\frac{3}{2}x - \frac{3}{32}\sin 16x\big) + \frac{1}{4}\sin 4x\cos^3 4x\big] + c$
5. $x + \frac{1}{3}\tan^3 x - \tan x + c$
6. $-\frac{1}{4}\cot^4 x + \frac{1}{2}\cot^2 x + \ln \mid \sin x \mid + c$
7. $\sqrt{x} - \frac{1}{2}\sin(2\sqrt{x}) + c$
8. $-\frac{1}{4}\cot x\csc^3 x + \frac{1}{4}\big(-\frac{1}{2}\tan\frac{x}{2} + \frac{1}{2}\cot^2\frac{x}{2} - 2\ln|\tan x|\big) + \frac{3}{16} + c$
9. $-\frac{1}{5}\cot^5 x + c$
10. $\frac{1}{15}\sec^3 x(3\sec^2 x - 5) + c$

11. $\frac{\tan^3 x}{3}+c$
12. $-\frac{1}{2}\sec x\tan x+\frac{1}{4}\sec^3 x\tan x-\frac{1}{2}\ln|\sec x+\tan x|+\frac{3}{8}\left(\sec x\tan x+\ln|\sec x+\tan x|\right)+c$
13. $\frac{1}{4}\tan x\sec^3 x+\frac{3}{4}\left(\frac{1}{2}\sec x\tan x+\frac{1}{2}\ln|\sec x+\tan x|\right)+c$
14. $-x+\frac{\tan^5 x}{5}-\frac{\tan^3 x}{3}+\tan x+c$
15. $\frac{1}{40}\left(-5\cos(4x)-2\cos(10x)\right)+c$
16. $\frac{1}{2}\left(\sin x+\frac{\sin 7x}{7}\right)+c$
17. $\frac{1}{16}\left(4\sin(2x)-\sin(8x)\right)+c$
18. $\frac{1}{16}\left(4\cos 2x-\cos 8x\right)+c$

Exercise 5-3

1. $\frac{\sqrt{x^2-16}}{16x}+c$
2. $\frac{x\sqrt{9-x^2}}{2}+\frac{9}{2}\sin^{-1}(\frac{x}{3})+c$
3. $-\frac{x}{\sqrt{9x^2-1}}+c$
4. $\sinh^{-1}(\frac{x}{3})+c$
5. $-\frac{\sqrt{x^2+4}}{4x}+c$
6. $\frac{1}{16}\ln|4-x|-\frac{1}{16}\ln|x+4|-\frac{1}{4(x-4)}+c$
7. $\frac{1}{4}\sin^{-1}(x^4)+c$
8. $\operatorname{csch}^{-1}(3\cot x)+c$
9. $\frac{1}{2}\left[\frac{x}{x^2+1}+\tan^{-1}(x)\right]+c$
10. $\frac{x}{2}\sqrt{x^2-16}-8\cosh^{-1}(\frac{x}{4})+c$
11. $\sqrt{e^{2x}-25}-5\tan^{-1}(\frac{1}{5}\sqrt{e^{2x}-25})+c$
12. $\sin^{-1}\left(\frac{\sin x}{\sqrt{2}}\right)+c$
13. $\ln|\frac{\sqrt{x^2+2}}{\sqrt{2}}+\frac{x}{\sqrt{x^2+2}}|+c$
14. $\frac{2x}{3\sqrt{1-x^2}}+\frac{x}{3(1-x^2)^{3/2}}+c$
15. $\frac{1}{2}\left[e^x\sqrt{1-e^{2x}}+\sin^{-1}(e^x)\right]+c$
16. $-\frac{\sqrt{9-x^2}}{x}-\sin^{-1}(\frac{x}{3})+c$

Exercise 5-4

1. $\ln|x-1|-\ln|x|+c$
2. $\ln 3-\frac{1}{2}\ln 5$
3. $-\frac{1}{2}\tanh^{-1}(\frac{x}{2})+c$
4. $\frac{1}{3}\ln|\frac{x-2}{x+1}|+c$
5. $\frac{5}{4}\ln|x+6|-\frac{1}{4}\ln|x+2|+c$
6. $4\ln|x+4|-3\ln|x+3|+c$
7. $4-6\ln 3+3\ln 5$
8. $\frac{1}{2}\left(25\ln|x^2-25|+x^2-25\right)+c$
9. $\frac{5}{6}\ln|x+6|-\frac{1}{5}\ln|x+1|+c$
10. $\frac{2}{3\sqrt{3}}\tan^{-1}\left(\frac{2x+3}{3\sqrt{3}}\right)$
11. $-\frac{1}{4}\ln|x^2+1|-\frac{1}{2}\tan^{-1}x+\frac{1}{2}\ln|x-1|+c$
12. $-\frac{2}{3}\tanh^{-1}(\frac{2x-1}{3})+c$
13. $\frac{x^2}{2}+3x+\frac{11}{7}\ln|x+2|+\frac{136}{7}\ln|x-5|+c$
14. $\tan^{-1}x$
15. $\ln|x|+\frac{2}{\sqrt{5}}\tanh^{-1}(\frac{2x+1}{\sqrt{5}})+\ln|5-(2x+1)^2|-\frac{4}{\sqrt{5}}\tanh^{-1}(\frac{2x-1}{\sqrt{5}})+c$
16. $\frac{2}{3}\ln 2$
17. $-3\ln|x|-\frac{2}{x}+3\ln|x+1|+c$
18. $1-\ln(e+1)+\ln(2)$
19. $-\frac{1}{4}\tanh^{-1}(\frac{e^x-1}{4})+c$
20. $\frac{1}{x}-\tanh^{-1}(x)+c$

Exercise 5-5

1. $\tan^{-1}(3)-\tan^{-1}(2)$
2. $-\frac{1}{2\sqrt{2}}\tanh^{-1}\left(\frac{x-3}{2\sqrt{2}}\right)+c$
3. $\tanh^{-1}(\frac{x+1}{2})+\ln|(x+1)^2-4|-\frac{3}{2}\tanh^{-1}(\frac{x+1}{2})+c$
4. $1-x-5\tanh(1-x)+c$
5. $\sin^{-1}(2/3)-\csc^{-1}(3)$
6. $-\frac{1}{5}\tanh^{-1}(\frac{x+4}{5})+c$
7. $5\sin^{-1}(\frac{x+2}{\sqrt{5}})+c$
8. $-\frac{1}{\sqrt{2}}\tanh^{-1}(\frac{e^x+1}{\sqrt{2}})+c$
9. $\frac{1}{\sqrt{2}}\sin^{-1}\left(\frac{2x+3}{\sqrt{21}}\right)+c$
10. $\frac{1}{2}\left(\sin^{-1}(x-1)+(x-1)\sqrt{1-(x-1)^2}\right)+c$
11. $\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{\tan\sqrt{x}-3}{\sqrt{3}}\right)+c$
12. $\frac{9}{2}\left(\sin^{-1}(\frac{x+1}{3})+\frac{(x+1)\sqrt{9-(x+1)^2}}{9}\right)+c$

Exercise 5-6

1. $4(\frac{\sqrt{x}}{2}-\sqrt[4]{x})-4\ln(\sqrt[4]{x}+1)+c$
2. $10(\frac{x^{9/10}}{9}-\frac{x^{3/10}}{3})+\frac{10}{3}\tan^{-1}x^{3/10}+c$
3. $\sqrt{2}\sinh(\tan(\frac{x}{2}))+c$
4. $(\sqrt{x}+4)^2-16(\sqrt{x}+4)+32\ln|\sqrt{x}+4|+c$
5. $-\frac{1}{\sqrt{2}}\tanh^{-1}\left(\frac{\tan(x/2)+3}{2\sqrt{2}}\right)+c$
6. $-x-\frac{3}{\sqrt{2}}\tan^{-1}\left(\frac{1-3\tan(x/2)}{2\sqrt{2}}\right)+c$
7. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\sqrt{2}\tan(\frac{x}{2})\right)+c$
8. $2(x^{\frac{1}{6}}+1)^3-9(x^{\frac{1}{6}}+1)^2+18(x^{\frac{1}{6}}+1)-6\ln|x^{\frac{1}{6}}+1|+c$
9. $4\left(\frac{x^{\frac{5}{4}}}{5}+\frac{x^{\frac{3}{4}}}{3}-\frac{x}{4}-\frac{\sqrt{x}}{2}+x^{\frac{1}{4}}-\ln|x^{\frac{1}{4}}+1|\right)+c$
10. $-10\left(\frac{x^{2/5}}{4}+\frac{x^{3/10}}{3}+\frac{x^{1/5}}{2}+x^{1/10}+\ln|x^{1/10}-1|\right)+c$
11. $-\frac{2}{\sqrt{3}}\tanh^{-1}(\sqrt{3}\tan(x/2))+c$
12. $\sqrt{2}\tanh^{-1}\left(\frac{\tan(x/2)-1}{\sqrt{2}}\right)+c$

Review Exercises

1. $\frac{(2x-1)}{4}e^{2x}+c$
2. $\frac{e^{x^2}}{2}+c$
3. $\sin x-x\cos x+c$
4. $\frac{1}{16}\big(4x\sin(4x)+\cos(4x)\big)+c$
5. $\frac{2}{9}x^{3/2}(3\ln|x|-2)+c$
6. $x\cos^{-1}x-\sqrt{1-x^2}+c$
7. $x\tan x+\ln|\cos x|+c$
8. $-\frac{xe^{-4x}}{4}-\frac{e^{-4x}}{16}+c$
9. $\sqrt{5}-\sqrt{2}$
10. $x\ln^3x-3x\ln^2x+6(x\ln x-x)+c$
11. $\frac{\sin^7x}{7}-\frac{2\sin^7x}{7}+\frac{\sin^3x}{3}+c$
12. $\frac{1}{32}\left(\frac{3x}{4}-\frac{3}{16}\sin(4x)-\frac{1}{4}\sin^3 2x\cos 2x\right)+c$
13. $\frac{\sec^3x}{3}+c$
14. $\frac{\sec^5x}{5}-\frac{\sec^3x}{3}+c$
15. $-\frac{1}{4}\cot x\csc^3x+\frac{1}{4}\Big(-\frac{1}{2}\tan^2(\frac{x}{2})+\frac{1}{2}\cot^2(\frac{x}{2})-2\ln|\tan(\frac{x}{2})|\Big)+c$
16. $-\frac{1}{7}\cot^7x-\frac{1}{5}\cot^5x+c$
17. $\frac{1}{2}\big(-\frac{\sin 4x}{4}+\frac{\sin 2x}{2}\big)+c$
18. $\frac{1}{2}\big(\frac{1}{4}\cos(4x)-\frac{1}{10}\cos(10x)\big)+c$
19. $\frac{1}{12}\big[3\sin(2x)+\sin(6x)\big]+c$
20. $\frac{x\sqrt{25-x^2}}{2}+\frac{25}{2}\sin^{-1}(\frac{x}{5})+c$
21. $\sin^{-1}(\frac{x}{5})+c$
22. $\sqrt{x^2-16}-4\tan^{-1}\left(\frac{\sqrt{x^2-16}}{4}\right)+c$
23. $\frac{1}{2(16-x^2)}+c$
24. $-\frac{x^2+2}{(x^2+3)^{\frac{3}{2}}}+c$
25. $\frac{81}{16}\pi$
26. $\tanh^{-1}(1-x)+c$
27. $\frac{1}{2}\ln|\frac{1}{4}(x-2)^2+1|+\tan^{-1}(\frac{x-2}{2})+c$
28. $\frac{3}{2}\ln|\frac{1}{4}(x-3)^2+1|+5\tan^{-1}(\frac{x-3}{2})+c$
29. $-\frac{2}{5}\tanh^{-1}(\frac{2x+3}{5})+c$
30. $\frac{1}{2}\ln|5-(2x+1)^2|-\frac{1}{\sqrt{5}}\tanh^{-1}(\frac{2x+1}{\sqrt{5}})+c$
31. $\frac{1}{3}\Big[\ln|x-1|+5\ln|x+2|\Big]+c$
32. $4-\frac{\ln 2}{3}+\frac{4\ln 5}{3}$
33. $6\big(x+2\ln|x-2|\big)-\frac{3x^2-10}{x-2}+c$
34. $\frac{1}{2}(x-1)^2+2(x-1)-8\ln|x-1|+c$
35. $x^2-x+\frac{1}{x+1}+\frac{1}{2}\ln(x-3)-\frac{3}{2}\ln(x+1)-6+c$
36. $x-\ln(e^x+1)+c$
37. $\frac{4}{5(x+2)}+\frac{9}{25}\ln|x-3|+\frac{16}{25}\ln|x+2|+c$
38. $\frac{x-3}{7(x^2+x+2)}+\frac{1}{7\sqrt{7}}\tan^{-1}\left(\frac{2x+1}{\sqrt{7}}\right)+c$
39. $\frac{1}{27}\left[\frac{3(55x-107)}{(x-2)^2}+\ln|x-2|+53\ln|x+1|\right]+c$
40. $\frac{2}{9}(x^3-2)\sqrt{x^3+1}+c$
41. $\frac{2}{3}\tan^{-1}(\sqrt{x^3-1})+c$
42. $(\sqrt{x}+1)\big((\sqrt{x}+1)-4\big)+2\ln(\sqrt{x}+1)+c$
43. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\tan(x/2)}{\sqrt{2}}\right)+c$
44. $-\frac{2}{\tan(x/2)-1}+c$
45. $\frac{1}{5}\Big[\ln|\tan(\frac{x}{2})+2|-\ln|2tan(\frac{x}{2})-1|\Big]+c$
46. $\frac{1}{2}\ln\left(\frac{2+\sqrt{3}}{2}\right)$

47. c
48. b
49. c
50. a
51. d
52. c
53. b
54. b
55. a
56. c
57. c
58. d
59. a
60. b
61. d
62. b
63. a
64. c
65. a
66. b
67. a
68. c
69. a
70. d
71. d
72. c

➤ Chapter Six:

Exercise 6-1

1. 0
2. 6
3. $-\infty$
4. -1
5. $-\infty$
6. $-\infty$
7. e^2
8. 1
9. 0
10. 0
11. 1
12. 1
13. 0
14. 1

Exercise 6-2

1. Divergent
2. Convergent
3. Divergent
4. Convergent
5. Divergent
6. Divergent
7. Divergent
8. Divergent
9. Convergent
10. Convergent
11. Convergent
12. Convergent
13. Divergent
14. Divergent
15. Convergent
16. Divergent

Review Exercises

1. ∞
2. $-\infty$
3. 0
4. 0
5. 1
6. $\ln(3)$
7. 1
8. 2
9. $1/e$
10. e^2
11. Convergent
12. Convergent
13. Divergent
14. Convergent
15. Divergent
16. Divergent
17. Divergent
18. Convergent
19. b
20. b
21. a
22. c
23. b
24. b
25. b
26. d
27. c
28. c
29. d
30. c
31. b
32. c
33. d
34. c
35. b

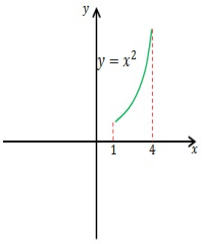
➤ Chapter Seven:

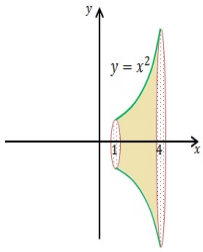
Exercise 7-1

1. $13/3$
2. 4
3. $27/2$
4. $14/3$
5. $5/4$
6. 2
7. $\ln(2)/2$
8. $1/4$
9. $7/6$
10. $5/6$
11. 4
12. $4/3$
13. 63
14. 4
15. $3/\sqrt[3]{4}$
16. $5/9$
17. $4\sqrt{2}/3$
18. 10
19. $3/2$
20. $e^3 - e^{-2}$
21. $e(e-1)$
22. $5\ln 5 - 4$
23. $(\sqrt{2}-1)/\sqrt{2}$
24. $\sqrt{2}-1$
25. $\sqrt{2}$
26. $14/3$
27. 1

Exercise 7-2

1.





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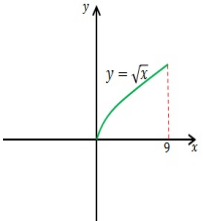

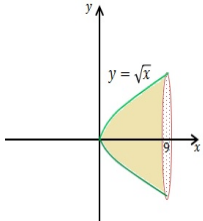

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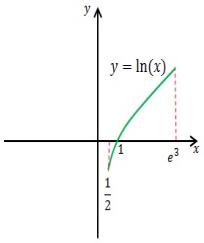

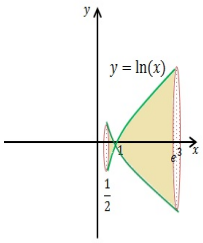

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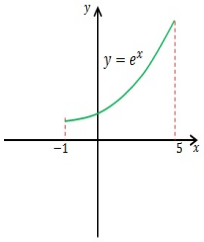
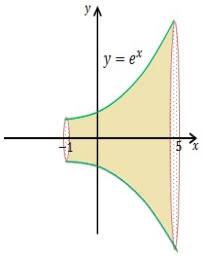
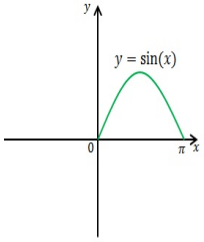
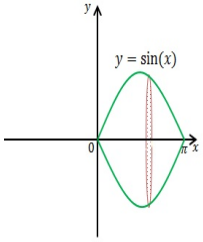




5.





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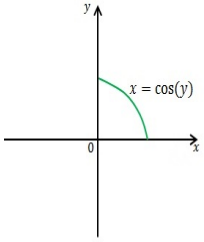

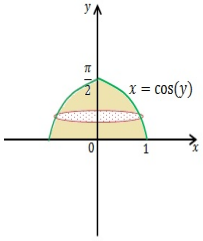

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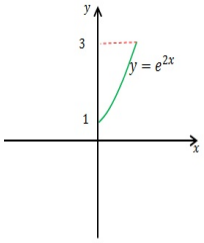

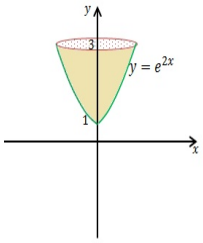

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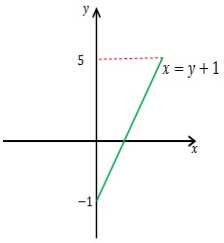

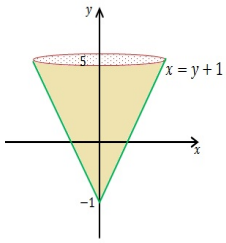

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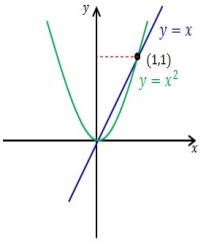

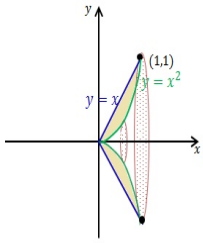

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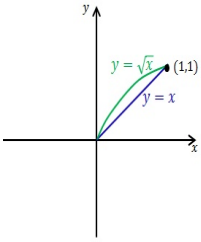
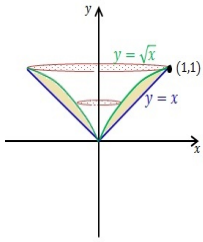




Exercise 7-3

1. $\frac{7}{3}\pi$
2. $\frac{206}{15}\pi$
3. $\frac{128}{7}\pi$
4. 8π
5. $\frac{\pi}{6}$
6. $\frac{\pi^2}{4}$
7. $\frac{2}{3}\pi$
8. π
9. $\frac{15}{2}\pi$
10. $\frac{243}{5}\pi$
11. $\frac{\pi^2}{4}$
12. $(e-2)\pi$
13. $\frac{\pi}{2}$
14. $2e^2\pi$
15. 9π
16. $\frac{24}{5}\pi$
17. $\frac{8}{3}\pi$
18. $\frac{8}{5}\pi$
19. $\frac{29}{30}\pi$
20. $\frac{256}{15}\pi$
21. $\frac{38}{15}\pi$
22. $\frac{\pi}{2}$
23. $\frac{17}{6}\pi$
24. $\frac{67}{6}\pi$
25. 24π
26. $\frac{120+60\pi-11\pi}{15\pi}$
27. $\frac{21\pi}{2}$
28. $\frac{4\pi}{5}$
29. $\frac{768\pi}{7}$
30. 2π

31. $\frac{\pi}{2}$
32. $\frac{2\pi}{15}$
33. $\frac{\pi(\pi\sqrt{2}-4)}{2}$
34. $\frac{\pi}{6}$
35. $8\pi(3-\ln 4)$

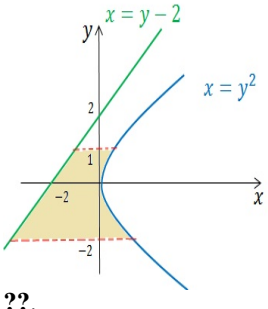
Exercise 7-4

1. $2(\sqrt{5}-1)+\tanh^{-1}(\sqrt{2})-\tanh^{-1}(\sqrt{10})$
2. $\sqrt{1+e^2}-\tanh^{-1}(\sqrt{1+e^2})-\sqrt{2}+\tanh^{-1}(\sqrt{2})$
3. $\frac{1}{4}\left(-2\sqrt{5}+6\sqrt{37}-sinh^{-1}(2)+sinh^{-1}(6)\right)$
4. $\frac{1}{4}\left(-2\sqrt{5}+4\sqrt{17}-\coth^{-1}(\frac{2}{\sqrt{5}})+\coth^{-1}(\frac{4}{\sqrt{17}})\right)$
5. $\frac{1}{2}\left(\sqrt{2}+sinh^{-1}(1)\right)$
6. $\ln(2+\sqrt{3})-sinh^{-1}(1)$
7. $\frac{14}{3}$
8. $\frac{\pi}{3}$
9. $2\sqrt{5}$
10. $sinh(3)-sinh(1)$
11. $\frac{1}{12}\left(-2\sqrt{13}+8\sqrt{73}-9\ln(2+\sqrt{13})+9\ln(8+\sqrt{73})\right)$
12. $\frac{1}{4}\left(2\sqrt{5}+sinh^{-1}(2)\right)$
13. $\ln(\sqrt{2}+1)$
14. 8π
15. $\frac{\pi}{6}(17\sqrt{17}-5\sqrt{5})$
16. $\pi\left(-\sqrt{2}+e\sqrt{1+e^2}-sinh^{-1}(1)+sinh^{-1}(e)\right)$
17. $\pi\left(\sqrt{2}(3\sqrt{5}-1)-sinh^{-1}(1)+sinh^{-1}(3)\right)$
18. $\pi(\sqrt{2}+sinh^{-1}(1))$
19. $\pi\left(-e\sqrt{1+e^2}+e^2\sqrt{1+e^4}-sinh^{-1}(e)+sinh^{-1}(e^2)\right)$
20. $36\sqrt{82}\pi$
21. $\frac{\pi}{27}(145\sqrt{145}-1)$
22. $\frac{\pi}{4}\left(2\sqrt{3}+\ln(2+\sqrt{3})\right)$
23. $\frac{5\pi}{27}(29\sqrt{145}-2\sqrt{10})$
24. $\frac{\pi}{6}(5\sqrt{5}-1)$

Review Exercises

1. $\frac{20\sqrt{5}}{3}$
2. 4
3. $\frac{1}{4}$
4. 3
5. 4π
6. 12
7. $\frac{1}{3}$
8. 44
9. 0
10. 1
11. 10
12. $\frac{11}{6}$
13. $\frac{2-\sqrt{2}}{\sqrt{2}}$
14. 3

??.



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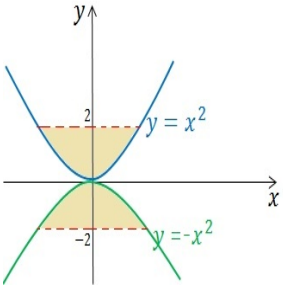
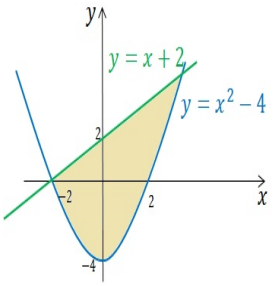


27. $\frac{2}{3}\pi$
28. $\frac{64\sqrt{2}}{3}\pi$
29. $\frac{16}{3}\pi$
30. $\frac{2\sqrt{2}}{3}\pi$
31. $\frac{1944}{5}\pi$
32. $\frac{2}{15}\pi$
33. $\frac{2}{35}\pi$
34. $\frac{373}{14}\pi$
35. $\frac{512}{15}\pi$
36. $\frac{(e^4-1)\pi}{2}$
37. $\left(6+4\ln^2(4)-16\ln(2)\right)\pi$
38. $\frac{\pi^2}{4}$
39. $\frac{\pi}{2\sqrt{2}}$
15. $\frac{79}{225}$
16. $\frac{e^3-1}{e^2}$
17. $2\sqrt{2}-1$
18. $\frac{1}{2}$
19. $\frac{1}{\sqrt{2}}$
20. $\ln(3+2\sqrt{2})$
21. $1+\ln(3)\left(\ln(\ln(3))-1\right)$
22. $2\left(\sqrt{2}+\sinh^{-1}(1)\right)$
23. $\frac{\ln(2)}{2}$

??.



40. 8π
41. $\frac{2}{5}\pi$
42. $\frac{64}{15}\pi$
43. $\frac{72}{5}\pi$
44. $\frac{16}{15}\pi$
45. 8π
46. $\pi(\pi-2)$
47. $\frac{\pi}{2}(\sqrt{2}\pi-4)$
48. $\frac{16}{3}\pi$
49. $\frac{\pi}{6}$
50. $\frac{3}{2}\pi$
51. 8π
52. $\frac{25}{2}\pi$
53. $\sqrt{17}+\frac{\sinh^{-1}(4)}{4}$

54. $4\sqrt{2}$
55. $\frac{1}{27}(22\sqrt{22}-13\sqrt{13})$
56. $\frac{2}{27}(37\sqrt{37}-1)$
57. $\frac{1}{27}\left((4+18\sqrt[3]{2})^{\frac{3}{2}}-(4+9(2)^{\frac{3}{2}})^{\frac{3}{2}}\right)$
58. 45
59. $\frac{2}{3}(2\sqrt{2}-1)$
60. $\frac{14}{3}$
61. $-\frac{\sqrt{17}}{4}+\frac{\sqrt{1+e^2}}{e}+\sinh^{-1}(4)-\sinh^{-1}(e)$
62. 74
63. $-\sqrt{5}+\tanh^{-1}(\sqrt{5})+\sqrt{17}-\tanh^{-1}(\sqrt{17})$
64. $\ln(\sqrt{2}+1)$
65. $\frac{3\pi}{2}-3\cos^{-1}(\frac{4}{3})$
66. $6\sqrt{5}\pi$
67. 16π
68. $\frac{\pi}{9}(82\sqrt{82}-1)$
69. $\frac{\pi}{6}(5\sqrt{5}-1)$
70. $\pi\left[e\sqrt{1+e^2}+\ln(e+\sqrt{1+e^2})-\sqrt{2}-\ln(\sqrt{2}+1)\right]$
71. $(\sqrt{2}+sinh^{-1}(1))\pi$
72. $\frac{\pi}{32}(438\sqrt{37}-sinh^{-1}(6))$
73. 8π
74. $\frac{2\pi}{3}(10\sqrt{10}-1)$
75. $a^2\pi$
76. $\frac{\pi}{6}(5\sqrt{5}-1)$
77. $2\pi(\sqrt{2}+sinh^{-1}(1))$
78. *d*
79. *a*
80. *a*
81. *a*
82. *a*
83. *a*
84. *d*

➤ Chapter Eight:
Exercise 8-1

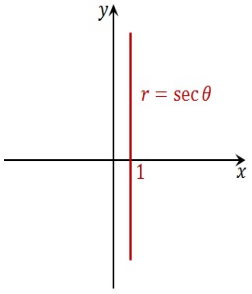
1. $y=2x+1$
2. $x+2y^2=1$
3. $y=x^2$
4. $(x-1)^2+(y-1)^2=1$
5. $x=\ln(\ln y)$
6. $x^2+y^2=9$
7. $x=3y+5$
8. $y=x^3$
9. $\frac{3}{2},\ 3$
10. $18,\ 18$
11. $\frac{4}{3},\ 0$
12. $-\frac{9}{2},\ -\frac{1}{2}$
13. $-1,\ 1$
14. $\frac{1}{\sqrt{2}-1},\ -\frac{1}{\sqrt{2}-1}$
15. $0,\ 2$
16. $6,\ 6$
17. 4
18. $\frac{2\sqrt{2}}{3}$
19. $-\frac{9}{2}$
20. $-\frac{1}{2\sqrt{3}}$
21. $\frac{1}{3}$
22. $\sqrt{3}$
23. 3
24. $30\sqrt[3]{25}$
25. Horizontal line at $(0,0)$ and no vertical line.
26. Horizontal line at $(0,0)$ and no vertical line.
27. There are no horizontal or vertical lines.
28. Horizontal lines at $(1,2)$ and $(1,-2)$ and vertical line at $(0,0)$.
29. Vertical line at $(-3,1)$ and no horizontal lines.
30. Horizontal lines at $(1,2)$ and $(1,-2)$, and vertical lines at $(0,0)$ and $(2,0)$
31. $4\sqrt{10}$
32. $2(5\sqrt{5}-1)$
33. $\frac{1}{4}\left(-2\sqrt{5}+8\sqrt{65}-sinh^{-1}(2)+sinh^{-1}(8)\right)$
34. $\frac{\pi}{12}$
35. $-\sqrt{2}+\sqrt{17}+\tanh^{-1}(\sqrt{2})-\tanh^{-1}(\sqrt{17})$
36. π
37. $\frac{3\pi}{4}$
38. $\frac{61}{216}$
39. $\frac{\pi}{6}(5\sqrt{5}-1)$
40. $\frac{2\sqrt{2}\pi(1+2e^{\pi})}{5}$
41. $\frac{5\sqrt{5}\pi}{6}(13\sqrt{13}-1)$

42. $\frac{13\pi}{6}$
43. $\frac{\pi}{6}(17\sqrt{17}-1)$
44. $2\pi^2$
45. $\sqrt{2}\pi$
46. $\frac{\pi}{54}(145\sqrt{145}-1)$

Exercise 8-2

1. $(0,1)$
2. $(0,-1)$
3. $(\sqrt{2},\sqrt{2})$
4. $(-3,0)$
5. $(0,-\frac{1}{2})$
6. $(-3,0)$
7. $(-\frac{7}{\sqrt{2}},\frac{7}{\sqrt{2}})$
8. $(\frac{3\sqrt{3}}{2},\frac{3}{2})$
9. $(\sqrt{2},\frac{\pi}{4})$
10. $(2,\frac{\pi}{2}+n\pi)$, $n\in\mathbb{Z}$
11. $(\sqrt{2},-\frac{\pi}{4})$
12. $(2\sqrt{3},\frac{\pi}{3})$
13. $(\sqrt{6},35.26)$
14. $(3,0)$
15. $(2\sqrt{5},26.57)$
16. $(3\sqrt{2},\frac{5\pi}{4})$
17. $r=9\sec\theta$
18. $r=1$
19. $y=1$
20. $x^2+y^2-2x=0$
21. $r=3\tan\theta\sec\theta$
22. $r=4\sqrt{\sec 2\theta}$
23. $\sqrt{x^2+y^2}-y=3$
24. $x^2+y^2+2y-3\sqrt{x^2+y^2}=0$

25.



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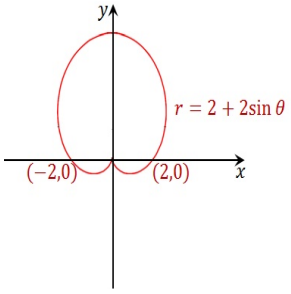

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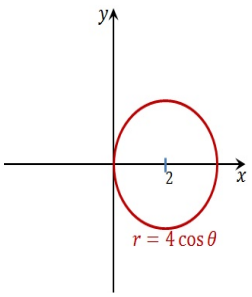

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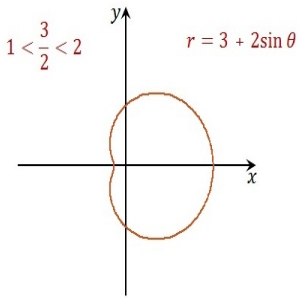


29. $-\sqrt{3}$
30. $-\frac{3}{3+2\sqrt{2}}$
31. The curve has a vertical tangent line.
32. $-(1+\sqrt{2})$
33. 1

Exercise 8-3

1. 4π
2. $\frac{3}{2}\pi$
3. 25π
4. 2π
5. 54π
6. 6π
7. $\frac{27}{4}\pi$
8. 11π
9. $\frac{4-\pi}{2}$
10. $\frac{9\sqrt{3}}{2}-\pi$
11. 10π
12. $\frac{5}{4}\pi-2$
13. $\frac{8+\pi}{4}$
14. $\frac{(\pi+2)}{2}$
15. $\frac{9\sqrt{3}}{2}+3\pi$
16. $\frac{\pi-2}{8}$
17. π
18. $5\pi-8$
19. $\frac{3\pi}{8}-1$
20. $\frac{\pi}{2}$

Exercise 8-4

1. 3π
2. π
3. 16
4. 6π
5. 24
6. $\frac{1}{2}(\sqrt{2}+sinh^{-1}1)$
7. $\frac{64\pi}{\sqrt{5}}$
8. 2π
9. $\frac{288\pi}{5}$
10. 128π
11. $16\pi^2$
12. $\frac{2304\pi}{5}$
13. $\frac{64}{5}\pi$
14. 32π
15. $\frac{64}{5}\pi$
16. $\frac{256}{5}\pi$
17. $32\pi^2$
18. 2π

Review Exercises

1. $y=\frac{2x}{3}+1$
2. $y=\ln(x)$
3. $y=x+2$
4. $y=\frac{1}{x}$
5. $\frac{x^2}{9}+\frac{y^2}{4}=1$
6. $x^2+y^2=1$
7. $y=e^xe^{e^x}$
8. $y=2x^2+4$
9. $\frac{4}{5}$, 0
10. 6, 12
11. $\frac{8\sqrt{2}}{3}$, 0
12. 0, $\frac{2}{3}$
13. $-\frac{1}{\sqrt{3}}$, -1
14. -1, 0
15. $-\sqrt{3}$, -1
16. $\frac{1}{12}$, $-\frac{1}{24}$

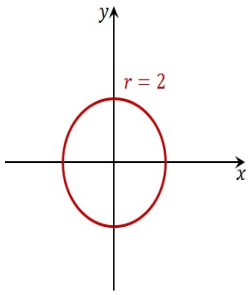
17. $y = \frac{1}{4}x + 3$
18. $y = -\sqrt{2}x + \frac{3}{2}$
19. $y = \frac{2\sqrt{2}}{3}x - \frac{1}{3}$
20. $y = 4x - \frac{2}{\sqrt{3}}$
21. $y = -\frac{1}{9}x - \frac{61}{9}$
22. $y = -x + 2$
23. $y = 2\sqrt{3}x - (2\sqrt{3} + 3)$
24. $y = 24x - (24\ln(4) - 9)$
25. Vertical line at $(-3, 1)$ and no horizontal lines.
26. Horizontal line at $(\frac{65}{8}, -\frac{25}{4})$ and vertical line at $(-2, -4)$ and $(2, 6)$.
27. Horizontal line at $(1, 0)$ and no vertical lines.
28. Horizontal line at $(0, -2)$ and $(2, 2)$ and no vertical lines.
29. Horizontal line at $(0, 1)$ and $(0, -1)$ and vertical line at $(1, 0)$ and $(-1, 0)$.
30. Horizontal line at $(1, 2)$ and $(1, -2)$ and vertical line at $(2, 0)$ and $(0, 0)$.
31. Horizontal line at $(\frac{3}{4}, -\frac{1}{4})$ and vertical line at $(1, 0)$.
32. There are no horizontal or vertical lines.
33. $\frac{1}{20}(10\sqrt{101} + \sinh^{-1}(10))$
34. $5\sqrt{5}$
35. π
36. 4π
37. $3\sqrt{10} + \sinh^{-1}(3)$
38. $\frac{1}{16}(28\sqrt{3} - 4\sqrt{17} + \tanh^{-1}(\frac{7}{4\sqrt{3}}) - \coth^{-1}(\frac{4}{\sqrt{17}}))$
39. $\sqrt{2}(e^{\frac{\pi}{2}} - 1)$
40. $\frac{8}{63}(65\sqrt{65} - 2\sqrt{2})$
41. $\frac{\pi}{6}(37\sqrt{37} - 1)$
42. $\frac{2(64+247\sqrt{13})\pi}{1215}$
43. 4π
44. $\frac{\pi}{3}(32 - 20\sqrt{2})$
45. 16π
46. $\frac{2\sqrt{2}\pi}{5}(1 + 2e^{\pi})$
47. $\frac{4\pi}{3\sqrt{2}}\left((1+e)^{\frac{3}{2}} - 2\sqrt{2}\right)$
48. $\frac{32\pi}{3}(5\sqrt{5} - 1)$
49. $\frac{1250\pi}{3}$
50. $39\sqrt{10}\pi$
51. $\sqrt{2}\pi$
52. $6\pi^2$
53. $\pi(-\sqrt{2} + e^e\sqrt{e^{2e}+1} - \sinh^{-1}(1) + \sinh^{-1}(e^e))$
54. $\left(\frac{28\sqrt{2}+81\sin^{-1}(\frac{4\sqrt{2}}{9})}{\sqrt{2}}\right)\pi$
55. $\frac{8\pi}{3}(2\sqrt{2} - 1)$
56. $\frac{8\pi}{\sqrt{2}}$
57. $(-2, 0)$
58. $(-4, 0)$
59. $(-1, -\sqrt{3})$
60. $(\frac{\sqrt{3}}{2}, 12)$
61. $(4\sqrt{2}, 4\sqrt{2})$
62. $(2, 0)$
63. $(0, -5)$
64. $(-\sqrt{2}, \sqrt{2})$
65. $(\sqrt{2}, \frac{\pi}{4})$
66. $(1, 0)$
67. $(6, \frac{\pi}{3})$
68. $(2\sqrt{2}, \frac{\pi}{4})$
69. $(1, \frac{\pi}{2})$
70. $(\frac{3}{2}, 19.47)$
71. $(3, \frac{\pi}{2})$
72. $(5, -53.13)$
73. $r = 3\sec\theta$
74. $r = -7\csc\theta$
75. $r = 1$
76. $r = 6\cos\theta$
77. $r^2 = 8\csc 2\theta$
78. $r = 9\cot\theta\csc\theta$
79. $r = -9\sin\theta$
80. $r^2 = 25\sec 2\theta$
81. $x^2 + y^2 = 9$
82. $x^2 + y^2 - y = 0$
83. $x^2 + y^2 - 2x = 0$
84. $y = 4$
85. $x = 1$

86. $x-y=4$

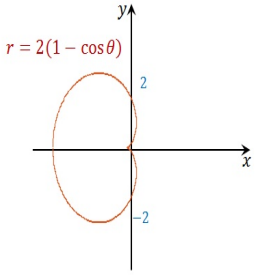
87. $\sqrt{x^2+y^2}-y=2$

88. $\sqrt{x^2+y^2}+2x=3$

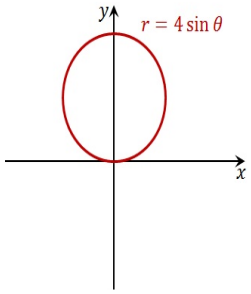
89.



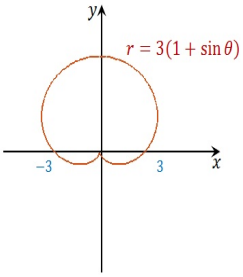
90.



91.



92.



93. 4π

94. 9π

95. $\frac{\pi-2}{16}$

96. $\frac{3\pi}{2}$

97. 6π

98. $-\frac{1}{4}(e^{-4\pi}-1)$

99. $\frac{9\sqrt{3}}{2}+2\pi$

100. $\pi+8$

101. $\frac{\pi}{8}$

102. $\frac{3\pi-8}{2}$

103. $2(\pi-2)$

104. $\frac{2(\pi-6)}{3}$

105. 10π

106. $2(3\pi-8)$

107. $-\frac{\sqrt{3}}{8}+\frac{5\pi}{24}$

108. 5π

109. 3π

110. 4π

111. 2π

112. 8

113. $\sqrt{2}(e^{2\pi}-1)$

114. $12\sqrt{2}$

115. $\sqrt{5}\pi$

116. 2π

117. π^2

118. $\frac{512}{5}\pi$

119. $\frac{64}{5}\pi$

120. $\frac{2\sqrt{2}\pi}{5}(1+e^{2\pi})$

121. 3π

122. $2\pi^2$

123. 2π

124. $\frac{32\sqrt{2}}{5}\pi$

125. $\frac{64}{5}\pi$

126. 72π

127. $\frac{4\sqrt{2}\pi}{5}(e^{4\pi}-1)$

128. *d*

129. *a*

130. *b*

131. *a*

132. *d*

133. *a*

134. *d*

135. *a*

136. *c*

137. *a*

138. *a*

139. *b*

140. *b*

141. *c*

142. *c*

143. *d*

144. *a*

145. *b*

146. *a*

147. *c*

148. *b*

149. *b*

150. *a*