

Answers to Math 1552 Review Problems

1. -18 2. 7 3. $\frac{\sqrt{7}}{14}$ 4. $\frac{2}{3}$ 5. 0 6. -2 ; *dne* 7. -3 ; -3
8. 9 9. 0
10. $3x^2 - 24x + 35$ 11. $4x^3 - \frac{x^2}{15} + 1$ 12. $2x^{-0.6} - 12.6x^{1.1}$
13. $\frac{-24}{x^4} + \frac{3}{x^2}$ 14. $-\frac{4}{x^5} + \frac{9}{x^4} - \frac{6}{x^2}$ 15. $\frac{6}{\sqrt[3]{x^4}}$
16. $6x + 13$ 17. $\frac{1}{(x+2)^2}$ 18. $6x^2 - 6x + 2$
19. $\frac{-8}{(x-3)^2}$ 20. $5(6x^2 - 2x)(2x^3 - x^2 + 8)^4$ 21. $72x(3x^2 + 16)^{-4}$
22. $405t^2(9t^3 - 8)^{-\frac{1}{4}}$ 23. $\frac{36x}{\sqrt{3x^2+10}}$ 24. $(384x^3 - 4)(6x^3 - 1)^4$
25. $\frac{216x^3}{(2x^4+1)^4}$ 26. $8e^{-2x+9}$ 27. $-72x^2e^{4x^3}$
28. $6xe^{x^2+10}$ 29. -13 30. $\frac{dy}{dx} = -10e^{-10x}$
31. $f'' = 24x - 18$; -18 ; 54 32. $f'' = \frac{50}{(5+x)^3}$; $\frac{2}{5}$; $\frac{25}{1372}$
33. $f^{(3)}(x) = 60x^2 - 120x + 42$ $f^{(4)}(x) = 120x - 120$
34. $m = -4$; $y = -4x - 2$ 35. $x = 4, 7$ 36. $x = \frac{8}{5}$ 37. $m = 7$
38. $x = \frac{41}{12}$; increasing: $(-\infty, \frac{41}{12})$; decreasing: $(\frac{41}{12}, \infty)$
39. $x = \frac{-9}{2}$, 7 ; increasing: $(-\infty, \frac{-9}{2})$, $(7, \infty)$; decreasing: $(\frac{-9}{2}, 7)$
40. $x = \frac{-7}{2}$, 6 ; increasing: $(-\infty, \frac{-7}{2})$, $(6, \infty)$; decreasing: $(\frac{-7}{2}, 6)$
41. $x = 0$; decreasing: $(-\infty, 0)$; increasing: $(0, \infty)$
42. $x = \frac{7}{2}$; increasing: $(-\infty, \frac{7}{2})$; decreasing: $(\frac{7}{2}, \infty)$
43. relative minimum of $-\frac{121}{4}$ at $x = \frac{9}{2}$ no relative maxima
44. relative minimum of $-\frac{109}{6}$ at $x = -5$ relative maximum of $\frac{293}{24}$ at $x = \frac{-1}{2}$
45. relative minimum of -215 at $x = 5$ relative maximum of 41 at $x = -3$
46. relative minimum of -3365 at $x = -9$ and 9 relative maximum of 3196 at $x = 0$
47. no relative extrema
48. no relative extrema
49. relative minimum of -4 at $x = 0$ relative maximum of $\frac{4}{e^2} - 4$ at $x = -2$
50. concave upward on $(-\infty, \infty)$ no inflection points
51. concave upward on $(-\infty, 1)$ concave downward on $(1, \infty)$ inflection point: $(1, \frac{71}{3})$
52. concave upward on $(-\infty, 7)$ concave downward on $(7, \infty)$ no inflection points

53. increasing on $(2, \infty)$ decreasing on $(-\infty, 2)$
relative minimum $(2, -9)$
54. increasing on $(-\infty, 2), (4, \infty)$ decreasing on $(2, 4)$
relative maximum $(2, -1)$ relative minimum $(4, -4)$
55. increasing on $(-4, 0), (4, \infty)$ decreasing on $(-\infty, -4), (0, 4)$
relative minima $(-4, 0), (4, 0)$ relative maximum $(0, 256)$
56. 57. 58.
59. absolute maximum is 6 at $x = 1$ absolute minimum is $\frac{62}{27}$ at $x = \frac{1}{3}$
60. absolute maximum is $\frac{145}{3}$ at $x = -2$ absolute minimum is $-\frac{125}{3}$ at $x = 4$
61. absolute maximum is 20 at $x = 0$ absolute minimum is -605 at $x = -5$ and 5
62. absolute maximum is $\frac{4}{7}$ at $x = 0$ absolute minimum is $-\frac{4}{15}$ at $x = 8$
63. absolute maximum is $\frac{\sqrt{5}}{5}$ at $x = -\sqrt{5}$ absolute minimum is 0 at $x = 0$
64. $R'(3400) = -51$ 65. $R'(40) = 4197.81$
66. $S'(1) = -16.0$; $S'(5) = -4.82$; 0
67. a) $3400 - 2x$ b) $A(x) = 3400x - 2x^2$ c) $x = 850 \text{ m}$ d) $A = 1,445,000 \text{ m}^2$
68. 11; $P(11) = 1336$ 69. $(27, 72766)$
70. $14x + c$ 71. $5x^2 + 9x + c$ 72. $2x^6 + 2x^3 - 4x^2 + 13x + c$
73. $\frac{28}{3}\sqrt{x^3} + 12x + c$ 74. $\frac{3}{4}x^8 + 12x^5 + c$ 75. $\frac{-1}{20x^4} + c$ 76. $-15e^{-0.6x} + c$
77. $\frac{5}{9}(3x - 5)^3 + c$ 78. $\frac{-5}{4(6x+1)^4} + c$ 79. $\frac{1}{28}e^{4x^7} + c$ 80. $\frac{1}{2}e^{x^2+6x} + c$
81. 35 82. 20 83. $\frac{8}{3}$ 84. $\frac{310}{3}$
85. $C(x) = \frac{9}{2}x^2 - 15x + 70$ 86. $C(x) = 0.35e^{0.02x} + 4.65$
87. $\frac{37}{4}$ 88. 356 89. $e^4 + 6 \ln 3 - 17 \approx 44.19$ 90. $\frac{778}{3}$
91. 170,577; 121,319; slowly increasing without bound
92. $\frac{640}{3}$ 93. $\frac{184}{3}$ 94. 288 95. 8; 77.33; 469.67
96. 7.97 97. $(13, 403)$; CS: 2901.17; PS: 2985.67
101. $A = 1896.81$; $I = 1246.81$ 102. $A = 9013.84$; $I = 2713.84$
103. $P = 2650.00$ 104. $r = 8.40\%$
105. a. 4.163% b. 6.485 % c. 7.537% d. 5.127%
106. 19,615.37 107. 226,846.56
108. 3,163.34 109. 17,769.55
110. 684.05; 82,086.00; 28,086.00