CHAIN RULE / SUBSTITUTION METHOD

Y = f (x) = f (g (x))

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

1. $S = (t - 3)^4$
2. $Z = 3/(a^2 - y^2)^2$
3. $Y = (x^2 + 4)^2 (2x^3 - 1)^3$
4. $Y = x^2 / \sqrt{4 - x}^2$
5. $X = y \sqrt{1 - y}^2$
6. $Y = (1 - 5x)^6$
7. $f(x) = (3x - x^3 + 1)^4$
8. $Y = (3 + 4x - x^2)^{1/2}$
9. $Y = (x / 1 + x)^5$
10. $Y = 2x^2\sqrt{2 - x}$
11. $f(x) = x \sqrt{3 - x}^2$
12. $Z = w / \sqrt{1 - 4w}^2$
13. $Y = \sqrt{1 + x}$
14. $f(x) = \sqrt{x - 1 \frac{/}{/} x + 1}$
15. $Y = (x^2 + 3)^4 (2x^3 - 5)^3$
16. $S = t^2 + 2/3 - t^2$
17. $Y = (x^3 - 1/2x^3 + 1)^4$
18. $X = (1 + 2y)^3$
19. $Y = u - 1/u + 1$, $u = \sqrt{x}$
20. $Y = u^3 + 4$, $u = x^2 + 2x$
21. $Y = \sqrt{u}$, $u = q (3 - 2q)$ $u = x^2$
22. $Y = \sqrt{1 + u}$, $u = \sqrt{x}$

23. $(2x + 5)^2$
24. $(- 5x)^4$
25. $(3x + 7\sqrt{})^4$
26. $1/1 – 2x$
27. $(1 – 2x)^2$
28. $\sqrt{1 - 2x}$
29. $(x^2 – 4)^5$
30. $(\sqrt{1 - x}^2)^{2/3}$
31. $\sqrt{3x}^2 – 7$
32. $1 /1 – 2x^2$
33. $\sqrt{1 - 2x}^2$
34. $x\sqrt{1 - x}^2$
35. $1/4 –x$
36. $1\sqrt{4 - x}$
37. $1/(4 – x)^2$
38. $1/x^2 – 1$
39. $1/\sqrt{x}^2 – 1$
40. $x/\sqrt{1 + x}^2$
41. $1/\sqrt{1 - x}^2$
42. $\sqrt{(\frac{x}{1} - x)}$
43. $\sqrt{\frac{1-x}{91} + x)}$
44. $\sqrt{a}^2 + x^2$
45. $1/\sqrt{a}^2 + x^2$
46. $\sqrt{(1 - x + x)}$
47. $(1 – 2x^2)^2$
48. $x^2/\sqrt{a}^2 – x^2$
49. $(x + 1/x)^2$
50. $x\sqrt{(1 - x)/(1 + x)}$
51. $3\sqrt{x}^2 + 1$

52. $1/\sqrt{1+x}^3$
53. $\sqrt{1+2x\ /x}$
54. $x\ /\sqrt{1+\mathrm{x}}^2$
55. $\sqrt{1+2x}$ /x
56. $\sqrt{1+x}^2$ / x
57. $1/2x^2 - 3x + 4$
58. $x^2\sqrt{1-x}$
59. $\sqrt{1-x}^2$ /(1-x)
60. X $\sqrt{2x+3}$
61. $(x^3 + 2x)^{37}$
62. $(3x^2 + 2x - 1)^6$
63. $4/(3x^2 - 2x + 1)^3$
64. $\sqrt{x}^3$ -2x +5
65. $\sqrt{4+}3\ \sqrt{x}$
66. $3\ \sqrt{2x-5}$
67. $(x - 1/x + 2)^{3/2}$
68. $2/5\ (x-2)^{5/2}$
69. - ½ $(x - 1)^2$
70. $2\ \sqrt{x+3}$
71. $2/9\ (2 - 3x)^{3/2}$
72. $\frac{\sqrt{x^2}+1}{x^2-5}$
73. $2/9\ (3x - 1)^{3/2}$
74. $3/16\ (2x^2 + 3)^{4/3}$
75. $1/6\ (1 + y^4)^{3/2}$
76. Y = $\sqrt{(x}^2 - 2x +)^3$