The Weekly Rigor

101 Problems in Calculating Derivatives Using the Chain Rule with Solutions
(Part 11)

SET 2 PROBLEMS

Find the derivative $f'(x)$ of each of the following functions.

1. $f(x) = \left(\frac{x^2+3}{x+1}\right)^3$

2. $f(x) = \sqrt{x^3+1}(x^2+1)^4$

3. $f(x) = \sqrt[4]{\sqrt{x}+x^{\frac{4}{3}}}$

4. $f(x) = \sqrt[5]{1+x^{\frac{2}{3}}}$

5. $f(x) = (x^3+x^2+4)^{\frac{5}{3}}$

6. $f(x) = \sqrt[3]{(x^2+x)^2}$

7. $f(x) = \left(\frac{x^4-x^5}{x^2+x^3}\right)^3$

8. $f(x) = (x^2+x)^2(-x^2+x^3)^{\frac{3}{2}}$

9. $f(x) = \left(\frac{x-3}{x+8}\right)^4$

10. $f(x) = \left(\frac{x^2-4}{x^3+7}\right)^5$

11. $f(x) = (x^2+3)^4$

12. $f(x) = \frac{1}{\sqrt[3]{x-1}}$

13. $f(x) = \left(\sqrt{x^3+4}\right)^3$

14. $f(x) = \frac{1}{\left(\sqrt[3]{x}+x^2\right)^{-2}}$

15. $f(x) = \frac{1}{\sqrt{(x^3+x)^5}}$

16. $f(x) = \left(x^{\frac{2}{3}}+x^{\frac{1}{2}}\right)^3$

17. $f(x) = (x^3+x^2+2)^5$

18. $f(x) = \sqrt{x^2+3}$

19. $f(x) = (x^2+2)^{-3}$

20. $f(x) = \frac{1}{\sqrt[4]{\sqrt{x}+x}}$

21. $f(x) = \left(\sqrt{x}+\sqrt[3]{x^2}\right)^{\frac{4}{3}}$

22. $f(x) = \sqrt[4]{x^3+x^2+4}$

23. $f(x) = \frac{1}{(x^5+x^2)^3}$

24. $f(x) = \frac{1}{(x^5+x^2)^{\frac{3}{7}}}$

25. $f(x) = (x^3 + 1)^3 (5 + x^2)^4$ 26. $f(x) = (x^3 + x^2 + 1)^{-\frac{1}{2}}$ 27. $f(x) = \left(\sqrt[3]{x^5} + \sqrt[5]{x^{\frac{9}{2}}} \right)^{\frac{4}{3}}$

28. $f(x) = \dfrac{1}{\sqrt[5]{\left(\sqrt{x} + x^{\frac{1}{3}} \right)^2}}$ 29. $f(x) = \left(x^{\frac{3}{4}} + x^{\frac{1}{2}} \right)^{-4}$ 30. $f(x) = (x^2 + 3)^4 (x^2 + 2)^{\frac{3}{2}}$

31. $f(x) = \dfrac{1}{(x^4 + x)^{\frac{5}{6}}}$ 32. $f(x) = (x^2 + 2)^{\frac{3}{2}}$