The Weekly Rigor

No. 175

"A mathematician is a machine for turning coffee into theorems."

October 28, 2017

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. $f(x) = \left(\frac{x-3}{x+6}\right)^4$
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. $f(x) = (\sqrt{x^3 + 4})^3$
14. $f(x) = \frac{1}{(\sqrt[3]{x} + x^2)^{-2}}$
15. $f(x) = \frac{1}{\sqrt[3]{(x^3 + x)^5}}$
16. $f(x) = \left(\frac{x^2}{x^3} + x^{\frac{1}{2}}\right)^3$
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. $f(x) = (\sqrt{x} + \sqrt[3]{x^2})^{\frac{4}{3}}$
22. $f(x) = \sqrt[4]{x^3 + x^2 + 4}$
23. $f(x) = \frac{1}{(x^5 + x^2)^3}$
24. $f(x) = \frac{1}{(x^5 + x^2)^{\frac{7}{2}}}$

25.
$$f(x) = (x^3 + 1)^3 (5 + x^2)^4$$
 26. $f(x) = (x^3 + x^2 + 1)^{-\frac{1}{2}}$ 27. $f(x) = \left(\sqrt[3]{x^5} + \sqrt[5]{x^2}\right)^{\frac{4}{3}}$
28. $f(x) = \frac{1}{\sqrt[5]{(\sqrt{x} + x^{\frac{1}{3}})^2}}$ 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. $f(x) = \frac{1}{(x^4 + x)^{\frac{5}{6}}}$ 32. $f(x) = (x^2 + 2)^{\frac{3}{2}}$

"Only he who never plays, never loses."

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