

# 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$25. f(x) = (x^3 + 1)^3(5 + x^2)^4$$

$$26. f(x) = (x^3 + x^2 + 1)^{-\frac{1}{2}}$$

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

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

$$29. f(x) = \left(x^{\frac{3}{4}} + x^{\frac{1}{2}}\right)^{-4}$$

$$30. f(x) = (x^2 + 3)^4(x^2 + 2)^{\frac{3}{2}}$$

$$31. f(x) = \frac{1}{(x^4 + x)^6}$$

$$32. f(x) = (x^2 + 2)^{\frac{3}{2}}$$

“Only he who never plays, never loses.”

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