Differentiation - Chain Rule

Differentiate each function with respect to *x*.

1) $y = (x^3 + 3)^5$

2) $y = (-3x^5 + 1)^3$

3) $y = (-5x^3 - 3)^3$

4) $y = (5x^2 + 3)^4$

5) $f(x) = \sqrt[4]{-3x^4 - 2}$

6) $f(x) = \sqrt{-2x^2 + 1}$

7) $f(x) = \sqrt[3]{-2x^4 + 5}$

8) $y = (-x^4 - 3)^{-2}$

9) $y = (3x^3 + 1)(-4x^2 - 3)^4$

10) $y = \dfrac{(x^3 + 4)^5}{3x^4 - 2}$

11) $y = ((x + 5)^5 - 1)^4$

12) $y = (5x^3 - 3)^5 \sqrt[4]{-4x^5 - 3}$

Critical thinking question:

13) Give a function that requires three applications of the chain rule to differentiate. Then differentiate the function.