Product/Quotient/Chain Review MATH 122B

Consider the following table, and answer the below questions: (Be aware this can be asked in many different ways, with graphs, lists, part of the function given... similar to an exam question)

x	1	2	3	4
$f(x)$	2	4	1	3
$f'(x)$	-6	-7	-8	-9
$g(x)$	2	3	4	1
$g'(x)$	2/7	3/7	4/7	5/7

(a) If $h(x) = f(x) \cdot g(x)$ find $h'(1)$.

(b) If $h(x) = \dfrac{f(x)}{g(x)}$ find $h'(3)$.

(c) If $h(x) = f(g(x))$ find $h'(2)$.

(d) If $h(x) = f(x) + g(x)$ find $h'(4)$.

Find the derivative of the following: (Make sure you can simplify 'enough'... if you were to be asked to solve $f'(x) = 0$ you want a factored form of $f'(x)$ get it to this form as best as you can.)

1. $f(x) = \dfrac{3}{x^4} - \dfrac{7}{x^3} + \sqrt{x} + \dfrac{10}{\sqrt[4]{x}}$
2. $f(x) = x^{-1/2} - 14x^{-3/2}$
3. $f(x) = \dfrac{x^3 + 5}{x}$
4. $f(x) = (8x^2 - 4x)^3$
5. $f(x) = 4x^3 - 6x^{-2}$
6. $f(x) = (x + 1)(\sqrt{x} - 2)$
7. $f(x) = 5(3x^2 + 2)(2x - 1)(x^2 + 1)$
8. $f(x) = (x^{-1} - x^{-3})\left(3x^{-1} + \dfrac{x^4}{6}\right)$
9. $f(x) = \dfrac{6x + 1}{3x + 10}$
10. $f(x) = 10 \cdot \dfrac{x^{2.2}}{x^{3.2} + 5}$
11. $f(x) = \dfrac{(3x^2 + 1)(2x - 1)}{5x + 4}$
12. $f(x) = \dfrac{x^2 - 4}{x^3}$
13. $f(x) = \dfrac{(2x^2 + 3)(5x + 2)}{6x - 7}$

14. $f(x) = (8x^4 - 5x^2 + 1)^4$

15. $f(x) = (3x^4 + 1)^4(x^3 + 4)$

16. $f(x) = \dfrac{(5x - 6)^4}{3x^2 + 4}$

17. $f(x) = -2(12x^2 + 5)^{-6}$

18. $f(x) = 12x(2x^4 + 5)^{3/2}$

19. $f(x) = \dfrac{x^2 + 4x}{(3x^3 + 2)^4}$

20. $f(x) = -3\sqrt{7x^3 - 1}$

21. $f(x) = \sqrt{x^3 - 6x^2 + 9x + 1}$

22. $f(x) = e^{\sqrt{x^3 - 6x^2 + 9x + 1}}$

23. $f(x) = e^{5x^2 + 3^x + e^{2x+5}}$

24. $f(x) = (x^6 + 4x)^{100}(x^7 + 7^x)\sqrt[7]{2 - x + x^7}$

25. $f(x) = \dfrac{(x^6 + 4x)^{100}}{(x^7 + 7^x)\sqrt[7]{2 - x + x^7}}$

26. $f(x) = e^{x^2}$

27. $f(x) = 5^{x^2}$

28. $f(x) = x^2 \cdot 5^{x^3}$

29. $f(x) = \dfrac{10^{x^2 + 6x + \sqrt{x}}}{x^2 + 6x + \sqrt{x}}$

30. $f(x) = 15^{\sqrt{x^3 + x}}$

31. $f(x) = \left(\dfrac{8x - x^6}{x^4 + 4}\right)^{-4/5}$

32. $f(x) = 10\left(1 + \left(2 - (6 + 7x^4)^9\right)^3\right)^5$