Derivatives Practice – Definition, Power, Product, & Quotient Rule

Part One: Use the definition of a derivative to find the derivatives of the following.

1. $y = 4x^2 + 1$

2. $f(x) = \sqrt{4x - 5}$

3. $y = \dfrac{1}{x+2}$

Part Two: Find the derivative of each function. Do not use the definition. Use the power, product, and quotient rule.

4. $y = 4x^5 + x$

5. $f(x) = 4x^4 - 5x - 3$

6. $y = 3x^{\frac{5}{4}}$

7. $y = \dfrac{5}{4}x^{\frac{2}{3}}$

8. $y = -4x^{-5}$

9. $y = \dfrac{3}{x^3}$

10. $y = x^{\frac{2}{3}}$

11. $f(x) = -2\sqrt[4]{x}$

12. $y = -\dfrac{1}{2}x^4 + 3x^{\frac{5}{3}} + 2x$

13. $y = \dfrac{2}{2x^4 - 5}$

14. $f(x) = \dfrac{2}{x^5 - 5}$

15. $f(x) = \dfrac{5}{4x^3 + 4}$

16. $y = \dfrac{4x^3 - 3x^2}{4x^5 - 4}$

17. $y = \dfrac{x^3 - x^2 - 3}{x^5 + 3}$

18. $y = \dfrac{x^4 + 6}{3 - 4x^{-4}}$

19. $f(s) = -\dfrac{3}{s^2} - \dfrac{4}{s^4}$

20. $h(s) = \sqrt{2} \cdot \sqrt[3]{s} + \sqrt{2} \cdot \sqrt[5]{s}$

Part Three: For each problem, you are given a table containing some values of differentiable functions $f(x), g(x)$ and their derivatives. Use the table data and the rules of differentiation to solve each problem.

21. Given $h(x) = f(x) \cdot g(x)$, find $h'(3)$

x	f(x)	f'(x)	g(x)	g'(x)
1	2	−1	1	2
2	1	$\dfrac{1}{2}$	3	0
3	3	2	1	−2

22. Given $h(x) = \dfrac{f(x)}{g(x)}$, find $h'(3)$

x	f(x)	f'(x)	g(x)	g'(x)
1	3	−1	2	−1
2	2	−1	1	0
3	1	−1	2	1