

MCV 4U1 – Derivative Practice

Find the derivative for each of the following. Simplify answers for #1 – 22 only.

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| 1. $y = 5 - x^3$ | 2. $y = \sqrt[3]{x^2}$ | 3. $f(x) = ax^2 + bx + c$ |
| 4. $s(t) = 4t - \frac{4}{\sqrt{t}}$ | 5. $f(x) = \frac{2}{\sqrt{x}} + \frac{3}{x^2}$ | 6. $y = \frac{\sqrt{x}}{2} + \frac{x}{\sqrt{2}}$ |
| 7. $f(x) = (3x^2 + 2)(x^3 - 1)$ | 8. $y = \frac{x^3 - 4}{3x + 2}$ | 9. $f(x) = \frac{x^2 - x^4 + 3}{x^4}$ |
| 10. $y = (1 - x)(2\sqrt{x} + 1)$ | 11. $h(x) = (x^3 + 3x^2 - 2)^3$ | 12. $y = 4\sqrt{9 - 2x^2}$ |
| 13. $y = \frac{4}{(5x^2 + 1)}$ | 14. $y = \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^3$ | 15. $s(t) = \frac{1}{\sqrt{6 + 2t}}$ |
| 16. $f(x) = x^2(4x - 5)^2$ | 17. $g(x) = [x^2(4x - 5)]^3$ | 18. $y = \frac{3x + 2}{(x^2 - 5)^4}$ |
| 19. $y = \left(\frac{3x + 2}{x^2 - 5}\right)^6$ | 20. $y = (5x + 3)^2 \sqrt{x^2 - 1}$ | 21. $y = \frac{4x - 7}{\sqrt{2x + 3}}$ |
| 22. $f(x) = \sqrt{(2x - 5)(x^2 + 1)^3}$ | 23. $y = 2x^3(\sqrt{x - 1})(4x + 5)^4$ | |
| 24. $y = \frac{\sqrt[3]{4x - 3}}{(x^2 + 4)^3}$ | 25. $y = \left[\frac{2x^2 + x^2 - 9}{x^4 \sqrt{3x + 1}}\right]^5$ | |

ANSWERS

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| 1. $\frac{dy}{dx} = -3x^2$ | 2. $\frac{dy}{dx} = \frac{2}{3x^{5/3}}$ | 3. $f'(x) = 2ax + b$ |
| 4. $s'(t) = 4 + \frac{2}{t^{3/2}}$ | 5. $f'(x) = \frac{-2}{3x^{3/2}} - \frac{6}{x^3}$ | 6. $\frac{dy}{dx} = \frac{1}{4\sqrt{x}} + \frac{1}{\sqrt{2}}$ |
| 7. $f'(x) = 3x(5x^2 + 2x - 2)$ | 8. $y' = \frac{3x^2 + 4x + 12}{(3x + 2)^2}$ | 9. $f'(x) = 1 - \frac{3}{2x^5}$ |
| 10. $\frac{dy}{dx} = -3\sqrt{x} + \frac{1}{\sqrt{x}} - 1$ | 11. $h'(x) = 15x(x - 2)(x^3 + 3x^2 - 2)^2$ | 12. $\frac{dy}{dx} = \frac{-12x^2}{\sqrt{9 - 2x^2}}$ |
| 13. $\frac{dy}{dx} = \frac{-40x}{(5x^2 + 1)^2}$ | 14. $y' = \frac{1}{x^{3/2}} \left(x^{3/2} + 1\right) \left(x^{3/2} - \frac{1}{x^{3/2}}\right)^2$ | 15. $s'(t) = \frac{-1}{(6 + 2t)^{3/2}}$ |
| 16. $f'(x) = 2x(16x - 5)(4x - 5)^2$ | 17. $g'(x) = 12x^4(6x - 5)(4x - 5)^2$ | 18. $y' = \frac{-3(17x^2 + 12x^2 + 5)}{(x^2 - 5)^2}$ |
| 19. $y' = \frac{-18(3x + 2)^5(2x^2 - 2x^2 + 5)}{(x^2 - 5)^7}$ | 20. $\frac{dy}{dx} = \frac{(5x + 3)(35x^2 + 9x^2 - 20)}{2\sqrt{x^2 - 1}}$ | 21. $\frac{dy}{dx} = \frac{4x + 19}{(2x + 3)^{3/2}}$ |
| 22. $f'(x) = \frac{(7x^2 - 15x + 1)\sqrt{x^2 + 1}}{\sqrt{2x - 5}}$ | 23. $y' = 6x^2 \sqrt{x - 1}(4x + 5)^4 + 2x \left[\frac{1}{2}(x - 1)^{-1/2}(4x + 5)^4 + 24(x - 1)^{1/2}(4x + 5)^3 \right]$ | |
| 24. $\frac{dy}{dx} = \frac{\frac{1}{3}(4x - 3)^{-2/3}(4)(x^2 + 4)^3 - (4x - 3)^{1/3}(4)(x^2 + 4)^2(3x^2)}{(x^2 + 4)^6}$ | | |
| 25. $\frac{dy}{dx} = 5 \left[\frac{2x^2 + x^2 - 9}{x^4 \sqrt{3x + 1}} \right]^4 \left[\frac{(6x^2 + 2x)(x^4 \sqrt{3x + 1}) - (2x^2 + x^2 - 9)[4x^3(3x + 1)^{1/2} + x^4(\frac{1}{2})(3x + 1)^{-1/2}(3)]}{x^4(3x + 1)} \right]$ | | |