

Calculus Practice: Higher Order Derivatives 1b**For each problem, find the indicated derivative with respect to x .**

1) $y = 5x^2 + 4\sqrt[3]{x} + \sqrt[5]{x}$ Find $\frac{d^4y}{dx^4}$

2) $y = -5x^3$ Find $\frac{d^4y}{dx^4}$

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

4) $f(x) = -\frac{2}{x} - \frac{1}{x^5}$ Find $f^{(4)}$

5) $y = x - \frac{5}{x^4}$ Find $\frac{d^3y}{dx^3}$

6) $f(x) = -3\sqrt[3]{x^2} + 2\sqrt[5]{x^2} + \frac{3}{x^3}$ Find f'''

7) $f(x) = 2\sqrt[5]{x^2} + \frac{1}{x^5}$ Find f''

8) $y = 5\sqrt[5]{x^2}$ Find $\frac{d^2y}{dx^2}$

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

10) $f(x) = -\frac{4}{x^5}$ Find $f^{(4)}$

11) $f(x) = x^{-1} + \frac{2}{x^4}$ Find $f^{(4)}$

12) $y = -3x^4 + \frac{4}{x^4}$ Find $\frac{d^3y}{dx^3}$

13) $f(x) = \frac{2}{x^3}$ Find f'''

14) $y = 2x^3 - \frac{4}{x^4}$ Find $\frac{d^2y}{dx^2}$

15) $f(x) = 4x^2 + 3x^{-3}$ Find f''

16) $f(x) = 3x^{-2}$ Find $f^{(4)}$

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For each problem, find the indicated derivative with respect to x .

1) $y = 5x^2 + 4\sqrt[3]{x} + \sqrt[5]{x}$ Find $\frac{d^4y}{dx^4}$

$$\frac{d^4y}{dx^4} = -\frac{320}{81x^{\frac{11}{3}}} - \frac{504}{625x^{\frac{19}{5}}}$$

2) $y = -5x^3$ Find $\frac{d^4y}{dx^4}$

$$\frac{d^4y}{dx^4} = 0$$

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

$$f'''(x) = -\frac{40}{27x^{\frac{7}{3}}} + \frac{30}{x^4}$$

4) $f(x) = -\frac{2}{x} - \frac{1}{x^5}$ Find $f^{(4)}$

$$f^{(4)}(x) = -\frac{48}{x^5} - \frac{1680}{x^9}$$

5) $y = x - \frac{5}{x^4}$ Find $\frac{d^3y}{dx^3}$

$$\frac{d^3y}{dx^3} = \frac{600}{x^7}$$

6) $f(x) = -3\sqrt[3]{x^2} + 2\sqrt[5]{x^2} + \frac{3}{x^3}$ Find f'''

$$f'''(x) = -\frac{8}{9x^{\frac{7}{3}}} + \frac{96}{125x^{\frac{13}{5}}} - \frac{180}{x^6}$$

7) $f(x) = 2\sqrt[5]{x^2} + \frac{1}{x^5}$ Find f''

$$f''(x) = -\frac{12}{25x^{\frac{8}{5}}} + \frac{30}{x^7}$$

8) $y = 5\sqrt[5]{x^2}$ Find $\frac{d^2y}{dx^2}$

$$\frac{d^2y}{dx^2} = -\frac{6}{5x^{\frac{8}{5}}}$$

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

$$f^{(4)}(x) = -\frac{2016}{625x^{\frac{19}{5}}} + \frac{360}{x^7}$$

10) $f(x) = -\frac{4}{x^5}$ Find $f^{(4)}$

$$f^{(4)}(x) = -\frac{6720}{x^9}$$

11) $f(x) = x^{-1} + \frac{2}{x^4}$ Find $f^{(4)}$

$$f^{(4)}(x) = \frac{24}{x^5} + \frac{1680}{x^8}$$

12) $y = -3x^4 + \frac{4}{x^4}$ Find $\frac{d^3y}{dx^3}$

$$\frac{d^3y}{dx^3} = -72x - \frac{480}{x^7}$$

13) $f(x) = \frac{2}{x^3}$ Find f'''

$$f'''(x) = -\frac{120}{x^6}$$

14) $y = 2x^3 - \frac{4}{x^4}$ Find $\frac{d^2y}{dx^2}$

$$\frac{d^2y}{dx^2} = 12x - \frac{80}{x^6}$$

15) $f(x) = 4x^2 + 3x^{-3}$ Find f''

$$f''(x) = 8 + \frac{36}{x^5}$$

16) $f(x) = 3x^{-2}$ Find $f^{(4)}$

$$f^{(4)}(x) = \frac{360}{x^6}$$