

Calculus Practice: Calculating Derivatives 3b**Differentiate each function with respect to x .**

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

2) $y = -\frac{3}{4}x^{\frac{4}{3}} + 2x^{\frac{5}{4}} - \frac{3}{5}\sqrt[3]{x}$

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

4) $f(x) = 4x^{\frac{4}{3}} - \frac{5}{3}x^{\frac{1}{3}}$

5) $y = 2\sqrt[5]{x^2}$

6) $f(x) = 4\sqrt[3]{x}$

7) $y = -\frac{5}{3}x^{\frac{5}{3}} + x^{\frac{1}{5}}$

8) $f(x) = 3x^{\frac{5}{2}} + x^{\frac{3}{2}}$

9) $f(x) = \frac{5}{3}x^{\frac{4}{5}}$

10) $y = x^{\frac{5}{2}} - \frac{1}{2}\sqrt[5]{x^2} + \frac{5}{3}x^{\frac{1}{3}}$

Calculus Practice: Calculating Derivatives 3b

Differentiate each function with respect to x .

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

$$\begin{aligned}f'(x) &= -\frac{5}{3}x^{\frac{1}{4}} + \frac{5}{3}x^{-\frac{2}{3}} + \frac{3}{20}x^{-\frac{4}{5}} \\&= -\frac{5x^{\frac{1}{4}}}{3} + \frac{5}{3x^{\frac{2}{3}}} + \frac{3}{20x^{\frac{4}{5}}}\end{aligned}$$

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

$$\begin{aligned}f'(x) &= x^{\frac{1}{2}} - \frac{3}{25}x^{-\frac{4}{5}} \\&= x^{\frac{1}{2}} - \frac{3}{25x^{\frac{4}{5}}}\end{aligned}$$

$$5) y = 2\sqrt[5]{x^2}$$

$$\begin{aligned}\frac{dy}{dx} &= \frac{4}{5}x^{-\frac{3}{5}} \\&= \frac{4}{5x^{\frac{3}{5}}}\end{aligned}$$

$$7) y = -\frac{5}{3}x^{\frac{5}{3}} + x^{\frac{1}{5}}$$

$$\begin{aligned}\frac{dy}{dx} &= -\frac{25}{9}x^{\frac{2}{3}} + \frac{1}{5}x^{-\frac{4}{5}} \\&= -\frac{25x^{\frac{2}{3}}}{9} + \frac{1}{5x^{\frac{4}{5}}}\end{aligned}$$

$$9) f(x) = \frac{5}{3}x^{\frac{4}{5}}$$

$$\begin{aligned}f'(x) &= \frac{4}{3}x^{-\frac{1}{5}} \\&= \frac{4}{3x^{\frac{1}{5}}}\end{aligned}$$

$$2) y = -\frac{3}{4}x^{\frac{4}{3}} + 2x^{\frac{5}{4}} - \frac{3}{5}\sqrt[3]{x}$$

$$\begin{aligned}\frac{dy}{dx} &= -x^{\frac{1}{3}} + \frac{5}{2}x^{\frac{1}{4}} - \frac{1}{5}x^{-\frac{2}{3}} \\&= -x^{\frac{1}{3}} + \frac{5x^{\frac{1}{4}}}{2} - \frac{1}{5x^{\frac{2}{3}}}\end{aligned}$$

$$4) f(x) = 4x^{\frac{4}{3}} - \frac{5}{3}x^{\frac{1}{3}}$$

$$\begin{aligned}f'(x) &= \frac{16}{3}x^{\frac{1}{3}} - \frac{5}{9}x^{-\frac{2}{3}} \\&= \frac{16x^{\frac{1}{3}}}{3} - \frac{5}{9x^{\frac{2}{3}}}\end{aligned}$$

$$6) f(x) = 4\sqrt[3]{x}$$

$$\begin{aligned}f'(x) &= \frac{4}{3}x^{-\frac{2}{3}} \\&= \frac{4}{3x^{\frac{2}{3}}}\end{aligned}$$

$$8) f(x) = 3x^{\frac{5}{2}} + x^{\frac{3}{2}}$$

$$\begin{aligned}f'(x) &= \frac{15}{2}x^{\frac{3}{2}} + \frac{3}{2}x^{\frac{1}{2}} \\&= \frac{15x^{\frac{3}{2}}}{2} + \frac{3x^{\frac{1}{2}}}{2}\end{aligned}$$

$$10) y = x^{\frac{5}{2}} - \frac{1}{2}\sqrt[5]{x^2} + \frac{5}{3}x^{\frac{1}{3}}$$

$$\begin{aligned}\frac{dy}{dx} &= \frac{5}{2}x^{\frac{3}{2}} - \frac{1}{5}x^{-\frac{3}{5}} + \frac{5}{9}x^{-\frac{2}{3}} \\&= \frac{5x^{\frac{3}{2}}}{2} - \frac{1}{5x^{\frac{3}{5}}} + \frac{5}{9x^{\frac{2}{3}}}\end{aligned}$$