

Exercise 9.2

1. Differentiate the following functions with respect to x .

(a) $y = x^{\frac{5}{2}}$

(b) $f(x) = 4x^3 - 3x^2 + 4$

(c) $y = \frac{1}{2x^2} + \sqrt{x}$

(d) $y = (\sqrt{x} + 1)(\sqrt{x} - 1)$

(e) $f(x) = (2x + 1)^2$

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

(g) $y = \ln\left(\frac{1 + 2x}{1 - x^2}\right)$

(h) $y = \frac{\ln(\sqrt{x} - 1)^2}{\ln(\sqrt{x} + 1)^2}$

(i) $y = \log_2(2x^2 - 5x - 1)$

(j) $f(x) = \log_n(x - 2) - \log_n(2 - x)$

(k) $y = \log_{10}\left(\frac{1}{x^3}\right)$

2. Differentiate the following exponential functions with respect to x .

(a) $y = 6e^{-3x}$

(b) $f(x) = e^{x+2x^3}$

(c) $f(x) = e^{2x} - e^{-3x}$

(d) $f(x) = \frac{e^x - e^{-x}}{e^x}$

(e) $f(x) = \left(e^{3x} - \frac{1}{3e^{3x}}\right)^2$

(f) $y = (e^{2x} - e^{-2x})(e^{2x} + e^{-2x})$