

Zadania z analizy matematycznej. Pochodne funkcji.

1. Oblicz pochodną funkcji:

(a) $f(x) = \frac{1}{3}x^3 - \ln x + 4x^{-3} - \frac{3}{2} \frac{1}{x^3}$,

(b) $f(x) = \sqrt[3]{x^2}$,

(c) $f(x) = 2 \sin x + 4 \cos x + \frac{2}{x^5} - 2 \log_2 x$,

(d) $f(x) = x \sin x$,

(e) $f(x) = x^2 \cos x$,

(f) $f(x) = \sin x \cos x$,

(g) $f(x) = \frac{x+1}{x-3}$,

(h) $f(x) = \operatorname{tg} x$,

(i) $f(x) = \operatorname{ctg} x$,

(j) $f(x) = \frac{x \ln x}{x^3 - 4x^2 + x - 6}$,

(k) $f(x) = \frac{e^x(x^2 - 4x + 6)}{x - 5}$,

(l) $f(x) = \frac{\sqrt[3]{x} - \sqrt{x}}{\sqrt[4]{x}}$,

(m) $f(x) = \sin(2x)$,

(n) $f(x) = (x^2 - 3x + 1)^2$,

(o) $f(x) = (x^5 - 3x^3 + x)^8$,

(p) $f(x) = \sqrt{x-4}$,

(q) $f(x) = \frac{1}{\sqrt{x-1}}$,

(r) $f(x) = \sin^2 x$,

(s) $f(x) = \cos^2 x + 5 \cos x - 2$,

(t) $f(x) = \sqrt{\frac{2x+3}{-6x+1}}$,

(u) $f(x) = e^{3x+4}$,

(v) $f(x) = 2^{\sin x}$,

(w) $f(x) = 4^{(4 \cos x - 2x^3 + \frac{1}{x})} \cdot \sin x$,

(x) $f(x) = \left(1 + \frac{1}{x}\right)^{23}$,

(y) $f(x) = \frac{3^{4x} \cdot (x^4 - 5 \operatorname{tg} x)}{\sqrt{x^5 - 1}(x^2 - 3x + 5)}$,

(z) $f(x) = \ln \frac{5x}{\sin x}$,

(ż) $f(x) = 10 \cdot 7^{3x^2}$,

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

(bb) $f(x) = \frac{2}{3} \sqrt{x^5} - \frac{4x^2}{\sin x - \cos x}$,

(cc) $f(x) = \log_3 \frac{x+3}{3x-7}$,

(dd) $f(x) = 3x^7 \cdot \frac{\sin x - 8}{\cos x}$,

(ee) $f(x) = \frac{4x^2 + \cos(5x-3)}{2x^3 - 5x^2 + 1}$,

(ff) $f(x) = \sin x \cdot \ln \frac{2x-4}{3x-6}$.