FORMULE ȘI REGULI DE DERIVARE

Calculați $f'(x)$ în fiecare din cazurile următoare:

A) $f(x) = \ln x + \sqrt[3]{x} + \frac{x^3}{\sin x} + \cos x \cdot \ln x$

2) $f(x) = 2^x \cdot x^5 + \frac{\sin x}{\operatorname{ctg} x} + \arccos x - \operatorname{arcctg} x$

3) $f(x) = \sqrt[7]{x} + \log_5 x + \frac{x^3+1}{2x-1} + x^2 \cos x$

4) $f(x) = \frac{x^3+5x+1}{2x^4+7x+3} + \operatorname{arctg} x$

5) $f(x) = 2\operatorname{tg} x + \frac{\operatorname{ctg} x}{\arcsin x} - e^x + \sqrt{3}x$

6) $f(x) = \frac{\arcsin x}{5\sqrt{x}} + \frac{1}{x} - 3\log_2 x$

7) $f(x) = \operatorname{arctg} x + \sqrt[3]{x} + e^x - \frac{4}{x}$

8) $f(x) = 7\operatorname{ctg} x - 2\operatorname{arctg} x + \frac{4x^2+x}{\cos x}$

9) $f(x) = \frac{7}{x} + 2\cos x + 5^x - 8x^3$

10) $f(x) = 7\ln x + 4 - 3\sin x + \sqrt[8]{x}$

Calculați $f'(x)$ dacă

$$f(x) = \ln x + \sqrt[3]{x} + \frac{x^3}{\sin x} + \cos x \cdot \ln x$$

$$E_1)\ f'(x) = \frac{1}{x} + \frac{1}{3\sqrt[3]{x^2}} + \frac{(x^3)' \sin x - x^3 \cdot (\sin x)'}{\sin^2 x} +$$

$$+ \left((\cos x)' \cdot \ln x + \cos x \cdot (\ln x)' \right)$$

$$E_2)\ f'(x) = \frac{1}{x} + \frac{1}{3\sqrt[3]{x^2}} + \frac{3x^2 \sin x - x^3 \cdot \cos x}{\sin^2 x} +$$

$$+ (-\sin x) \cdot \ln x + \cos x \cdot \frac{1}{x}$$

Calculați $f'(x)$ dacă

$$f(x) = 2^x \cdot x^5 + \frac{\sin x}{\operatorname{ctg} x} + \arccos x - \operatorname{arcctg} x$$

$E_1)\ f'(x) = \left((2^x)' \cdot x^5 + 2^x \cdot (x^5)'\right) + \frac{(\sin x)' \operatorname{ctg} x - \sin x \cdot (\operatorname{ctg} x)'}{\operatorname{ctg}^2 x}$

$$+ \left(-\frac{1}{\sqrt{1-x^2}}\right) - \left(-\frac{1}{1+x^2}\right)$$

$E_2)\ f'(x) = \left(2^x \ln 2 \cdot x^5 + 2^x \cdot 5x^4\right) +$

$$+ \frac{\cos x \cdot \operatorname{ctg} x - \sin x \cdot \left(-\frac{1}{\sin^2 x}\right)}{\operatorname{ctg}^2 x} - \frac{1}{\sqrt{1-x^2}} +$$

$$+ \frac{1}{1+x^2}$$

$$f'(x) = 2^x \ln 2 \cdot x^5 + 2^x \cdot 5x^4 + \frac{\cos x \operatorname{ctg} x + \frac{1}{\sin x}}{\operatorname{ctg}^2 x} -$$

$$- \frac{1}{\sqrt{1-x^2}} + \frac{1}{1+x^2}$$

Calculați $f'(x)$ dacă

$$f(x)=\sqrt[7]{x}+\log_5 x+\frac{x^3+1}{2x-1}+x^2\cdot\cos x$$

$E_1)$ $f'(x)=\frac{1}{7\cdot\sqrt[7]{x^6}}+\frac{1}{x\ln 5}+\frac{(x^3+1)'(2x-1)-(x^3+1)(2x-1)'}{(2x-1)^2}+$

$$+(x^2)'\cos x+x^2(\cos x)'$$

$E_2)$ $f'(x)=\frac{1}{7\cdot\sqrt[7]{x^6}}+\frac{1}{x\ln 5}+\frac{3x^2\cdot(2x-1)-(x^3+1)\cdot 2}{(2x-1)^2}+$

$$+2x\cos x-x^2\sin x$$

Calculați $f'(x)$ dacă

$$f(x)=\frac{x^3+5x+1}{2x^4+7x+3}+\operatorname{arctg} x$$

$E_1)\ f'(x)=\dfrac{(x^3+5x+1)'(2x^4+7x+3)-(x^3+5x+1)(2x^4+7x+3)'}{(2x^4+7x+3)^2}+$

$$+\left(-\frac{1}{1+x^2}\right)$$

$E_4)\ f'(x)=\dfrac{(3x^2+5)(2x^4+7x+3)-(x^3+5x+1)(8x^3+7)}{(2x^4+7x+3)^2}-$

$$-\frac{1}{1+x^2}$$

$$f'(x)=\frac{6x^6+21x^3+9x^2+10x^4+35x+15-(8x^6+7x^3+40x^4+35x+8x^3+7)}{(2x^4+7x+3)^2}$$

$$-\frac{1}{1+x^2}$$

$$f'(x)=\frac{6x^6+10x^4+21x^3+9x^2+35x+15-8x^6-40x^4-15x^3-35x-7}{(2x^4+7x+3)^2}-$$

$$-\frac{1}{1+x^2}$$

$$f'(x)=\frac{-2x^6-30x^4+6x^3+9x^2+8}{(2x^4+7x+3)^2}-\frac{1}{1+x^2}$$