ODVODI

I. TABELA ODVODOV

FUNKCIJA	ODVOD
C	0
X	1
x^n	$n \cdot x^{n-1}$
$\sin(*)$	$\cos(*) \cdot (*)'$
$\cos(*)$	$-\sin(*) \cdot (*)'$
$\tan(*)$	$\frac{1}{\cos^2(*)} \cdot (*)'$
$\cot(*)$	$-\frac{1}{\sin^2(*)} \cdot (*)'$
e^*	$e^* \cdot (*)'$
$ln(*)$	$\frac{1}{*} \cdot (*)'$
$\log_a(*)$	$\frac{1}{(*) \cdot \ln a} \cdot (*)'$
a^*	$a^* \cdot \ln a \cdot (*)'$
$\arcsin(*)$	$\frac{1}{\sqrt{1-(*)^2}} \cdot (*)'$
$\arccos(*)$	$-\frac{1}{\sqrt{1-(*)^2}} \cdot (*)'$
$\arctan(*)$	$\frac{1}{1+(*)^2} \cdot (*)'$
$\text{arccot}(*)$	$-\frac{1}{1+(*)^2} \cdot (*)'$

1. Odvajaj

a.) $f(x) = 7$

$f'(x) = 0$

b.) $f(x) = x^3$

$f'(x) = 3x^2$

c.) $f(x) = 5x^4$

$f'(x) = 5 \cdot 4x^3 = 20x^3$

d.) $f(x) = \sin(5x)$

$f'(x) = \cos(5x) \cdot (5x)'$

$f'(x) = 5 \cdot \cos(5x)$

e.) $f(x) = e^{3x}$

$f'(x) = e^{3x} \cdot (3x)'$

$f'(x) = 3 \cdot e^{3x}$

f.) $f(x) = \sqrt[3]{(x^2+4)^2}$

$f'(x) = \left((x^2+4)^{\frac{2}{3}}\right)'$

$f'(x) = \frac{2}{3} \cdot (x^2+4)^{\frac{2}{3}-1} \cdot (x^2+4)'$

$f'(x) = \frac{2}{3} \cdot (x^2+4)^{-\frac{1}{3}} \cdot (2x)$

$f'(x) = \frac{2 \cdot 2x}{3} \cdot \frac{1}{(x^2+4)^{\frac{1}{3}}}$

$f'(x) = \frac{2 \cdot 2x}{3} \cdot \frac{1}{\sqrt[3]{(x^2+4)}}$

$f'(x) = \frac{4x}{3 \cdot \sqrt[3]{(x^2+4)}}$

g.) $f(x) = 4 \cdot x^2 + \cos(2x)$

$f'(x) = 8x - \sin(2x) \cdot (2x)'$

$f'(x) = 8x - 2\sin(2x)$

h.) $f(x) = \ln(3x+4)$

$f'(x) = \frac{1}{(3x+4)} \cdot (3x+4)'$

$f'(x) = \frac{3}{(3x+4)}$

II. PRAVILA ZA ODVAJANJE

a.)Odvod produkta

$$(A \cdot B)' = A' \cdot B + A \cdot B'$$

2.)Odvajaj

$$\mathrm{f}(x) = (x^2 + 5x - 7) \cdot (2x^3)$$

$$f'(x) = (x^2 + 5x - 7)' \cdot (2x^3) + (x^2 + 5x - 7) \cdot (2x^3)'$$

$$f'(x) = (2x + 5) \cdot (2x^3) + (x^2 + 5x - 7) \cdot 6x^2$$

$$f'(x) = 4x^4 + 10x^3 + 6x^4 + 30x^3 - 42x^2$$

$$f'(x) = 10x^4 + 40x^3 - 42x^2$$

$$\mathrm{f}(x) = (\sin x) \cdot (\cos x)$$

$$f'(x) = (\sin x)' \cdot (\cos x) + (\sin x) \cdot (\cos x)'$$

$$f'(x) = \cos x \cdot (\cos x) + (\sin x) \cdot (-\sin x)$$

$$f'(x) = \cos^2(x) - \sin^2(x)$$

$$f'(x) = \cos 2x$$

$$\mathrm{f}(x) = x^2 \cdot \ln x$$

$$f'(x) = (x^2)' \cdot \ln x + x^2 \cdot (\ln x)'$$

$$f'(x) = 2x \cdot \ln x + x^2 \cdot \frac{1}{x}$$

$$f'(x) = 2x \cdot \ln x + x$$

$$f'(x) = x \cdot (2\ln x + 1)$$

$$\mathrm{f}(x) = \cot x \cdot (\tan x - 1)$$

$$f'(x) = -\frac{1}{\sin^2 x} \cdot (\tan x - 1) + \cot x \cdot \frac{1}{\cos^2 x}$$

$$f'(x) = -\frac{1}{\sin^2 x} \cdot \left(\frac{\sin x}{\cos x} - 1\right) + \frac{\cos x}{\sin x} \cdot \frac{1}{\cos^2 x}$$

$$f'(x) = -\frac{1}{\sin x \cdot \cos x} + \frac{1}{\sin^2 x} + \frac{1}{\sin x \cdot \cos x}$$

$$f'(x) = \frac{1}{\sin^2 x}$$

$$f'(x) = \sin^{-2} x$$

a.)Odvod ulomka

$$\left(\frac{A}{B}\right)' = \frac{A' \cdot B - A \cdot B'}{B^2}$$

3.)Odvajaj

$$\mathrm{f}(x) = \frac{x^2+3}{x+1}$$

$$f'(x) = \frac{(x^2+3)' \cdot (x+1) - (x^2+3) \cdot (x+1)'}{(x+1)^2}$$

$$f'(x) = \frac{2x \cdot (x+1) - (x^2+3) \cdot 1}{(x+1)^2}$$

$$f'(x) = \frac{2x^2+2x-x^2-3}{(x+1)^2}$$

$$f'(x) = \frac{x^2+2x-3}{(x+1)^2}$$

$$f'(x) = \frac{(x+3) \cdot (x-1)}{(x+1)^2}$$

$$\mathrm{f}(x) = \frac{1-e^x}{e^x}$$

$$f'(x) = \frac{(1-e^x)' \cdot e^x - (1-e^x) \cdot (e^x)'}{e^{2x}}$$

$$f'(x) = \frac{-e^x \cdot e^x - (1-e^x) \cdot e^x}{e^{2x}}$$

$$f'(x) = \frac{-e^{2x} - e^x + e^{2x}}{e^{2x}}$$

$$f'(x) = \frac{-e^x}{e^{2x}}$$

$$f'(x) = -\frac{1}{e^x} = -e^{-x}$$

4.)Izračunajte odvod funkcije $\mathbf{f}(x) = \frac{x^2-x+1}{x^2+2x+1}$**. Koliko je** $f'(-2)$?

$$f'(x) = \frac{(2x-1)\cdot(x^2+2x+1)-(x^2-x+1)\cdot(2x+2)}{(x^2+2x+1)^2}$$

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

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

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

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

$$f'(x) = \frac{3\cdot(x^2-1)}{(x+1)^4}$$

$$f'(x) = \frac{3\cdot(x-1)\cdot(x+1)}{(x+1)^4}$$

$$f'(x) = \frac{3(x-1)}{(x+1)^3}$$

$$f'(-2) = \frac{3(-2-1)}{(-2+1)^3} = \frac{3\cdot(-3)}{(-1)^3} = \frac{-9}{-1} = 9$$