# Pravila diferenciranja

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$$1)\ (C\,u)^{'} = C\,u^{'}$$

$$2)\ (u + v)^{'} = u^{'} + v^{'}$$

$$3)\ (u - v)^{'} = u^{'} - v^{'}$$

$$4)\ (u \cdot v)^{'} = u^{'} \cdot v + u \cdot v^{'}$$

$$5)\ \left(\frac{u}{v}\right)^{'} = \frac{u^{'} \cdot v - u \cdot v^{'}}{v^{2}}$$

# Tablica izvoda nekih elementarnih funkcija

| | | |
|---|---|---|
| $\left(C\right)^{'}=0,\ C-const.$ | $\left(e^{x}\right)^{'}=e^{x}$ | $\left(a^{x}\right)^{'}=a^{x}\ln a$ |
| $\left(x^{n}\right)^{'}=nx^{n-1},\ n\in R$ | $\left(\sin x\right)^{'}=\cos x$ | $\left(\arcsin x\right)^{'}=\dfrac{1}{\sqrt{1-x^{2}}}$ |
| $\left(\dfrac{1}{x}\right)^{'}=-\dfrac{1}{x^{2}},\ \left(\sqrt{x}\right)^{'}=\dfrac{1}{2\sqrt{x}}$ | $\left(\cos x\right)^{'}=-\sin x$ | $\left(\arccos x\right)^{'}=-\dfrac{1}{\sqrt{1-x^{2}}}$ |
| $\left(\log_{a}x\right)^{'}=\dfrac{1}{x\cdot\ln a}$ | $\left(tgx\right)^{'}=\dfrac{1}{\cos^{2}x}$ | $\left(arctgx\right)^{'}=\dfrac{1}{1+x^{2}}$ |
| $\left(\ln x\right)^{'}=\dfrac{1}{x},\ x\in R/\{0\}$ | $\left(ctgx\right)^{'}=-\dfrac{1}{\sin^{2}x}$ | $\left(arcctgx\right)^{'}=-\dfrac{1}{1+x^{2}}$ |

**Primjer 1.** Odrediti izvode sledećih funkcija:

$a)\ y = 3x^3 - 4x^2 + 2x$

$\qquad y' = 3 \cdot 3x^{3-1} - 4 \cdot 2x^{2-1} + 2 \cdot 1x^{1-1}$

$\qquad y' = 9x^2 - 8x^1 + 2x^0$

$\qquad y' = 9x^2 - 8x + 2$

$$\left(x^n\right)' = nx^{n-1}$$

$b)\ y = \left(3x^2 + 1\right) \cdot \left(2x^2 + 3\right)$

$\qquad \left(u \cdot v\right)' = u' \cdot v + u \cdot v'$

$\qquad y' = \left(3x^2 + 1\right)' \cdot \left(2x^2 + 3\right) + \left(3x^2 + 1\right) \cdot \left(2x^2 + 3\right)'$

$\qquad y' = \left(3 \cdot 2x^{2-1} + 0\right) \cdot \left(2x^2 + 3\right) + \left(3x^2 + 1\right) \cdot \left(2 \cdot 2x^{2-1} + 0\right)$

$\qquad y' = 6x \cdot \left(2x^2 + 3\right) + \left(3x^2 + 1\right) \cdot 4x$

$\qquad y' = 6x \cdot 2x^2 + 6x \cdot 3 + 3x^2 \cdot 4x + 1 \cdot 4x$

$\qquad y' = 12x^3 + 18x + 12x^3 + 4x = \left(12x^3 + 12x^3\right) + \left(18x + 4x\right)$

$\qquad y' = 24x^3 + 22x$

$$c) \; y = \frac{x \ln x}{x + 1}$$

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

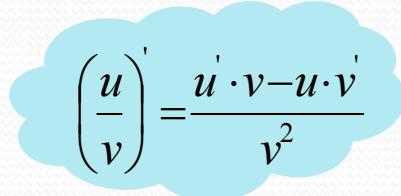$$\left(\frac{u}{v}\right)' = \frac{u' \cdot v - u \cdot v'}{v^2}$$

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

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

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

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

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

**Zadaci za vježbu:** Odrediti izvode sledećih funkcija

$a)\ y = 5x^6 - 3x^5 + 4x - 8$

$b)\ y = 6\sqrt[3]{x} - 4\sqrt[4]{x}$

$c)\ y = \left(x^2 - 7\right)\cdot\left(x^2 + 6\right)$

$d)\ y = x^2 \cdot \cos\ x$

$e)\ y = \dfrac{x^2 - x + 1}{x^2 + 1}$

$f)\ y = \dfrac{\ln\ x}{x^2}$

$g)\ y = x \cdot \sin\ x + \cos\ x$

$h)\ y = \left(2 - x^2\right)\cdot \cos\ x + 2x \cdot \sin\ x$

Uputstvo:
Koristiti tablicu
izvoda i osnovna
pravila izvoda.