ODVODI

$$\sin x' = \cos x \qquad \arcsin x' = \frac{1}{\sqrt{1-x^2}} \qquad C' = 0$$
$$\cos x' = -\sin x \qquad \arccos x' = \frac{-1}{\sqrt{1-x^2}} \qquad e^{x\,\prime} = e^x$$
$$\tan x' = \frac{1}{\cos^2 x} \qquad \operatorname{arctg} x' = \frac{1}{1+x^2} \qquad x^{a\,\prime} = a x^{a-1}$$
$$\cot x' = \frac{-1}{\sin^2 x} \qquad \operatorname{arccot} x' = \frac{-1}{1+x^2} \qquad \ln x' = \frac{1}{x}$$

$(Cf+Dg)' = Cf' + Dg'$ ... linearnost odvoda

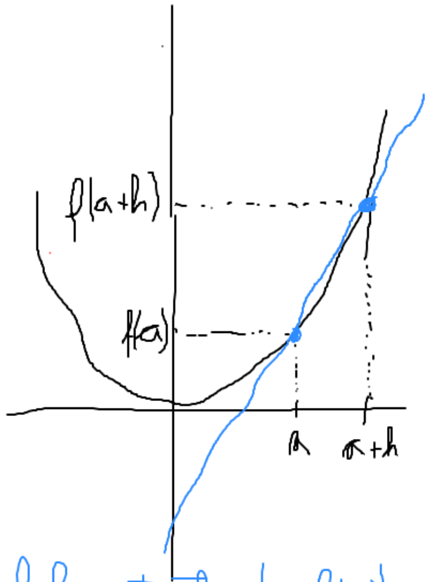
$(f\cdot g)' = f'g + fg'$, $\quad (f\cdot g\cdot h)' = f'gh + fg'h + fgh'$

$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

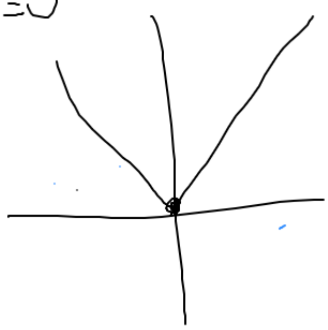
$$f(g(x))' = f'(g(x))\cdot g'(x)$$

$$f(g(h(x)))' = f'(g(h(x)))\cdot g'(h(x))\cdot h'(x)$$

DEF: $$f'(a) = \underbrace{\lim_{h\to 0} \underbrace{\frac{f(a+h)-f(a)}{\cancel{a}+h-\cancel{a}}}_{\text{smerni koef. sekante}}}_{\text{smerni koeficient tangente na graf } f \text{ v točki } (a, f(a))}$$



ZGLED: $f(x) = |x|$ ni odvedljiva v $x=0$



$\boxed{1.}$ (a) $$\left(x^3 - \frac{12}{x^7} + 2\sqrt[5]{x} - \frac{6}{x^{-2}} + 8x^{3/2} - 2x + x^{14} + x^e + 1\right)'$$

$$= 3x^2 - 12(x^{-7})' + 2(x^{1/5})' - 6(x^2)' + 8\cdot\frac{3}{2}x^{\frac{3}{2}-1} - 2x^0 + 14x^{13} + e x^{e-1} + 0$$

$$= 3x^2 - 12(-7)x^{-8} + \frac{2}{5}x^{-\frac{4}{5}} - 6\cdot 2x^1 + 12x^{1/2} - 2 + 14x^{13} + e x^{e-1}$$

(b) $\left(x^{\pi}+\sqrt{x}\right)\left(x^{3}-3x^{-3/7}\right)'=$ $\quad \sqrt{x} = x^{1/2}$ $\qquad -\frac{3}{7}-1=-\frac{10}{7}$

$$\left(\pi x^{\pi-1}+\frac{1}{2}x^{-1/2}\right)\left(x^{3}-3x^{-3/7}\right)+\left(x^{\pi}+\sqrt{x}\right)\left(3x^{2}-3\frac{-3}{7}x^{-10/7}\right)$$

(c) $$\left(\frac{x^{3}-3x+2}{x^{2}+7x-1}\right)'=\frac{(3x^{2}-3)(x^{2}+7x-1)-(x^{3}-3x+2)(2x+7)}{(x^{2}+7x-1)^{2}}$$

(d) $\cos^{3}x'=(\cos x)^{3}{}'=3\cos^{2}x\cdot(-\sin x)$

$\cos^3 x = f(g(x))$

$g(x)=\cos x$

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

(e) $\left(\cos^{2}x\cdot\cos 2x\right)'=\cos^{2}x'\cdot\cos 2x+\cos^{2}x\cdot\cos 2x'$

$=2\cos x\cdot(-\sin x)\cdot\cos 2x+\cos^{2}x\cdot(-\operatorname{sen}2x)\cdot 2$

(f) $x^{3}\cos(1-5x^{2})'=3x^{2}\cos(1-5x^{2})+x^{3}\cdot\left(-\sin(1-5x^{2})\right)\cdot(-10x)$

(g) $\left(x^{x}\right)'=\left(e^{\ln(x^{x})}\right)'=\left(e^{x\ln x}\right)'=\underbrace{e^{x\ln x}}_{x^{x}}\cdot(x\cdot\ln x)'$

$\ln(a^{b})=b\ln a$

$=x^{x}\cdot\left(1\cdot\ln x+x\cdot\frac{1}{x}\right)=\underline{\underline{x^{x}(\ln x+1)}}$

π^{e} ✓ $\qquad (-\pi)^{e}$ // $\qquad (-\pi)^{2}$ ✓ $\qquad (-e)^{3}$ ✓

$D_{x^{x}}=\underline{[0,\infty)}\cup\mathbb{Z}$

$\left(\frac{1}{2}\right)^{1/2}=\sqrt{1/2}$ ✓

$\left(-\frac{1}{2}\right)^{-1/2}=\frac{1}{\sqrt{-1/2}}$ //

$\left(-\sqrt{3}\right)^{-\sqrt{3}}$ //

(h) $$x^{(x^x)}{}' = e^{\ln(x^{x^x})}{}' = \left(e^{x^x \cdot \ln x}\right)' = \underline{e^{x^x \cdot \ln x}} \cdot \left(x^x \cdot \ln x\right)'$$

$$= x^{(x^x)} \cdot \left(\underline{x^x}(\ln x + 1) \cdot \ln x + \underline{x^x} \cdot x^{-1}\right)$$

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

(j) $$\ln \frac{\sqrt[3]{2x^3 + 3x^2}}{\sqrt{x + x^3}}{}' = \frac{\sqrt{x + x^3}}{\sqrt[3]{2x^3 + 3x^2}} \cdot \frac{\frac{1}{3}(2x^3 + 3x^2)^{-2/3} \cdot (6x^2 + 6x)\sqrt{x + x^3} - \sqrt[3]{2x^3 + 3x^2} \cdot \frac{1}{2}(x + x^3)^{-1/2} \cdot (1 + 3x^2)}{(x + x^3)}$$