

1) Vypočítat Taylorův polynom řádu 2 v bodě  $a=0$   
pro funkci  $f(x)=\operatorname{tg}(x)$

$$1) T_2(x) = f(0) + f'(0)x + \frac{f''(0)}{2}x^2$$

$$f(0) = \operatorname{tg}(0) = \boxed{0} \quad (x^n)' = nx^{n-1}$$

$$f'(x) = (\operatorname{tg} x)' = \frac{1}{\cos^2 x}$$

$$f'(0) = \frac{1}{1} = \boxed{1}$$

vnitřní:  $\cos x$   
vnější:  $y^{-2}$

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

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

$$f''(0) = \frac{2 \cdot 0}{1} = \boxed{0}$$

$$T_2(x) = 0 + x + 0x^2 = \boxed{x}$$



2) Vypočítat derivaci  $f(x) = \ln(\cos(x))$

$$\begin{aligned} \textcircled{2} \quad f'(x) &= (\ln(\cos x))' = \\ &= \frac{1}{\cos x} \cdot (-\sin x) = \\ &= -\frac{\sin x}{\cos x} = \boxed{-\tan x} \end{aligned}$$