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

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

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

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

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

vnitřní: $\cos x$, vnější: y^{-2}

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

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

② $f'(x) = (\ln(\cos x))' =$

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

$= -\frac{\sin x}{\cos x} = \boxed{-\operatorname{tg} x}$