№22. $f(x) = (e^x - 1)^{-2}$, $x_0 = \ln 2$.

$$f(x) = f(x_0) + \frac{f'(x_0)}{1!}(x - x_0) + \frac{f''(x_0)}{2!}(x - x_0)^2 + \ldots + \frac{f^{(n)}(x_0)}{n!}(x - x_0)^n + o((x - x_0)^n)$$

$f(x_0) = 1$

$f'(x_0) = -2(e^{x_0} - 1)^{-3} \cdot e^{x_0} = -4$

$f''(x_0) = -2\left(-3(e^{x_0} - 1)^{-4} \cdot e^{x_0 \cdot 2} - 2e^{x_0}(e^{x_0} - 1)^{-3}\right) = 20$

$f'''(x_0) = -2\left(12e^{3x_0}(e^{x_0} - 1)^{-5} - 9e^{2x_0}(e^{x_0} - 1)^{-4} + e^{x_0}(e^{x_0} - 1)^{-3}\right) = -124.$

$$f(x) = 1 - 4(x - \ln 2) + 10(x - \ln 2)^2 - \frac{62}{3}(x - \ln 2)^3 + o((x - \ln 2)^3).$$