PR10 $\quad x_0 = 0 \; ; \; n \; ; \; f(x) = e^x$

$$f(x) = e^x \qquad f(0) = e^0 = 1$$

$$f'(x) = e^x \qquad f'(0) = e^0 = 1$$

$$f''(x) = e^x \qquad f''(0) = e^0 = 1$$

$$f^{(n)}(x) = e^x \qquad f^{(n)}(0) = e^0 = 1$$

$$f^{(n+1)}(x) = e^x \Rightarrow R_n(x) = \frac{1}{(n+1)!} e^{\xi} x^{n+1}$$

$$e^x = \underbrace{1 + 1x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \dots + \frac{1}{n!}x^n}_{M_n(e^x, x)} + \underbrace{\frac{1}{(n+1)!}e^{\xi}x^{n+1}}_{R_n(x)}$$

; KDE ξ LEŽÍ MEDZI 0 a x

PR11 $\qquad \xi < 0.01$; e^1

$$R_n(x) = \frac{f^{(n+1)}(\xi)}{(n+1)!}\,x^{n+1} \Rightarrow \frac{1}{(n+1)!}\,e^{\xi}\cdot x^{n+1} < 0{,}01$$

- $e^1 = e^x \Rightarrow \boxed{x = 1}$
- ξ LEŽÍ MEDZI 0 a 1 $\Rightarrow \xi = 1$ $\qquad \frac{1}{(n+1)!}\,e^1 \cdot 1 < 0{,}01$

VYBERIEM ABY BOL ZLOMOK MAXIMÁLNY

$$\frac{2{,}72}{(n+1)!} < 0.01 \Rightarrow \boxed{272 < (n+1)!}$$

$n = 1 \Rightarrow (n+1)! = 2$

$n = 2 \Rightarrow (n+1)! = 3! = 6$

$n = 3 \Rightarrow (n+1)! = 4! = 24$

$n = 4 \Rightarrow (n+1)! = 5! = 120$

$$\boxed{n = 5 \Rightarrow (n+1)! = 6! = 720}$$

AK ZOBERIEM $n = 5$ TAK $\underline{\underline{\varepsilon < 0.01}}$

$$e^1 \approx 1 + 1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \frac{1}{5!} \doteq \underline{\underline{2{,}718}}$$

$\ln(1.3)$ POMOCOU T_2 + ODHAD MAX CHYBY

$f(x) = \ln x \qquad x_0 = 1 \Rightarrow f(x_0) = \ln 1 = 0$

$f'(x) = \frac{1}{x} \qquad f'(x_0) = \frac{1}{1} = 1$

$f''(x) = -\frac{1}{x^2} \qquad f''(x_0) = -1$

$$T_2(\ln x, 1, x) = 0 + \frac{1}{1!}(x-1) + \frac{-1}{2!}(x-1)^2 =$$

$$= \underline{\underline{x - 1 - \frac{1}{2}(x-1)^2}}$$

$$T_2(1.3) = 1{,}3 - 1 - \frac{1}{2}(1.3-1)^2 = 0.3 - \frac{1}{2}\cdot 0{,}3^2 =$$

$$= 0.3 - \frac{0.09}{2} = 0.3 - 0.045 = \underline{\underline{0{,}255}}$$

$$R_n(x) = \frac{f^{(n+1)}(\xi)}{(n+1)!}(x - x_0)^{n+1}$$

$$n = 2$$

$$\boxed{\begin{aligned} x &= 1{,}3 \\ x_0 &= 1 \end{aligned}}$$

$$f'''(x) = \frac{2}{x^3} \Rightarrow f'''(\xi) = \frac{2}{\xi^3}$$

$$R_2(x) = \frac{\frac{2}{\xi^3}}{(2+1)!}(1{,}3-1)^{2+1} = \frac{2}{3!\,\xi^3}(0{,}3)^3 =$$

$$= \frac{1}{3\xi^3}\cdot 0{,}027 = \frac{0.009}{\xi^3}$$

ξ JE MEDZI

$x_0 = 1$; $x = 1{,}3$

$\xi = 1 \Rightarrow$ MAX. CHYBA

$$\varepsilon = 0.009$$