

②

x	y_0, y_{10}	$y_i, i=1, n-1$	Δy	$\Delta^2 y$
0.0	1.1283792			
0.1		1.1171516	-0.0112276	-0.0217912
0.2		1.0841328	-0.0330188	-0.0198531
0.3		1.0312609	-0.0528719	-0.0168477
0.4		0.9615413	-0.0697196	-0.0130391
0.5		0.8787826	-0.0827587	-0.0087805
0.6		0.7872434	-0.0915392	-0.0044293
0.7		0.6912749	-0.0959685	-0.003205
0.8		0.5949858	-0.0962891	-0.0032719
0.9		0.5019686	-0.0930172	
1.0	0.4151075			
Σ	1.5434867	7.6483419		-0.0912178

Trapezoidal formula

$$\int_a^b f(x) dx \approx \frac{h}{2} [y_0 + y_{10} + 2(y_1 + \dots + y_9)]$$

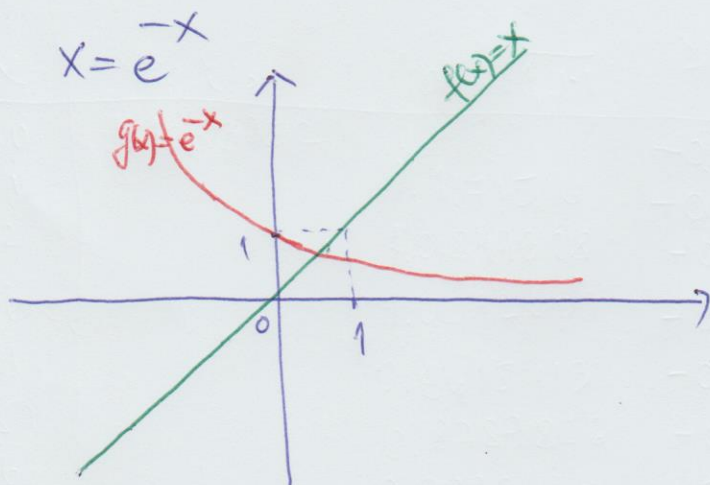
$$\approx \frac{0.1}{2} (1.5434867 + 2 \cdot 7.6483419)$$

$$\approx \underline{\underline{0.84201}}$$

Grade:

$$|R_T| \leq \frac{(b-a) |A_5|^2}{12} = \frac{1}{12} \cdot |A_5|^2 = \frac{1}{12} \cdot \frac{0.0912178}{8} = \underline{\underline{9.5 \cdot 10^{-4}}}$$

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~~the~~

segment $[0,1]$!

$$f(x) = x - e^{-x}$$

$$\varphi_1(x) = e^{-x}$$

$$\varphi_1'(x) = -e^{-x}$$

$$|\varphi_1'(x)| = e^{-x} < 1 \text{ on } [0,1]!$$

$$x = e^{-x} / \ln$$

$$-x = \ln x$$

$$x = -\ln x = \varphi_2(x)$$

$$\varphi_2'(x) = -\frac{1}{x}$$

$$|\varphi_2'(x)| = \frac{1}{x} > 1 \text{ on } [0,1]!$$

$$p(x) = e^{-x}$$

$$x_0 = 0.5$$

$$\varphi(x_0) = x_1 = e^{-x_0} = e^{-0.5}$$

$$x_1 = 0.6065$$

$$x_2 = \varphi(x_1) = e^{-0.6065}$$

$$x_2 = 0.5452$$

$$x_3 = \varphi(x_2) = 0.5797$$

$$x_4 = \varphi(x_3) = 0.5601$$

$$x_5 = \varphi(x_4) = 0.5712$$

$$x_6 = \varphi(x_5) = 0.5649$$

$$x_7 = \varphi(x_6) = 0.5684$$

$$x_8 = \varphi(x_7) = 0.5664$$

$$x_9 = \varphi(x_8) = 0.5676$$

$$x_{10} = \varphi(x_9) = 0.5669$$

$$x_{11} = \varphi(x_{10}) = 0.5673$$

$$x_{12} = \varphi(x_{11}) = \underline{\underline{0.5671}}$$

$$x_{13} = \varphi(x_{12}) = \underline{\underline{0.5672}}$$

$$x_{14} = \varphi(x_{13}) = \underline{\underline{0.5671}}$$

$$\Rightarrow x \approx 0.567$$

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x	cos x	Δy	$\Delta^2 y$	$\Delta^3 y$
7	0.75390	-1.66503	0.75833	1.05139
9	-0.91113	-0.9067	1.80972	
11	0.00443	0.90302		
13	0.90745			

$$\cos 8 = ? \quad \xi = \frac{x - x_0}{h} = \frac{8 - 7}{2} = \frac{1}{2} = 0.5$$

$$\mathcal{N}_3^{(1)}(x) = y_0 + \xi \Delta y_0 + \frac{\xi(\xi-1)}{2} \Delta^2 y_0 + \frac{\xi(\xi-1)(\xi-2)}{6} \Delta^3 y_0$$

$$\begin{aligned} \mathcal{N}_3^{(1)}(8) &= 0.75390 + 0.5 \cdot (-1.66503) + \frac{0.5(0.5-1)}{2} \cdot 0.75833 + \\ &+ \frac{0.5(0.5-1)(0.5-2)}{6} \cdot 1.05139 \end{aligned}$$

$$\mathcal{N}_3^{(1)}(8) = 0.75390 - 0.832515 - 0.09479125 + 0.065711875$$

$$\mathcal{N}_3^{(1)}(8) = -0.10769$$

greška: znamo funkciju! $|R| = |f(x) - \mathcal{N}_3^{(1)}(x)|$

$$f(x) = \cos x$$

$$f(8) = \cos 8 = -0.14550$$

$$|R| = |-0.14550 + 0.10765| = |-0.03785| = 0.03785$$