

**O‘ZBEKISTON RESPUBLIKASI OLIY VA O‘RTA MAXSUS
TA‘LIM VAZIRLIGI
MUHAMMAD AL-XORAZMIY NOMIDAGI TOSHKENT AXBOROT
TEXNOLOGIYALARI UNIVERSITETI NURAFSHON FILIALI**

“Kompyuter injiniringi” fakulteti

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guruh raqami: 710-21

Amaliy topshiriq

Dastur: <https://algoritm-amaliyot.netlify.app>

Dastur kodi: https://github.com/Ulugbek-Akmalovich-Shodimurodov/Algoritm_amaliyot

$$1. \quad y = \sin(x+3) \cdot \ln(x^2+3x+1) \quad [0; 1] \\ h = \frac{1-0}{10} = 0.1 \quad n=10$$

$$x_n = x_{n-1} + h$$

$$f(x_0) = \sin(0+3) \cdot \ln(0^2+3 \cdot 0+1) = 0$$

$$f(x_1) = \sin(0.1+3) \cdot \ln(0.1^2+3 \cdot 0.1+1) = 0.016$$

$$f(x_2) = \sin(0.2+3) \cdot \ln(0.2^2+3 \cdot 0.2+1) = 0.042$$

$$f(x_3) = \sin(0.3+3) \cdot \ln(0.3^2+3 \cdot 0.3+1) = 0.157$$

$$f(x_4) = \sin(0.4+3) \cdot \ln(0.4^2+3 \cdot 0.4+1) = 0.312$$

$$f(x_5) = \sin(0.5+3) \cdot \ln(0.5^2+3 \cdot 0.5+1) = 0.512$$

$$f(x_6) = \sin(0.6+3) \cdot \ln(0.6^2+3 \cdot 0.6+1) = 0.735$$

$$f(x_7) = \sin(0.7+3) \cdot \ln(0.7^2+3 \cdot 0.7+1) = 0.972$$

$$f(x_8) = \sin(0.8+3) \cdot \ln(0.8^2+3 \cdot 0.8+1) = 1.232$$

$$f(x_9) = \sin(0.9+3) \cdot \ln(0.9^2+3 \cdot 0.9+1) = 1.496$$

$$f(x_{10}) = \sin(1+3) \cdot \ln(1^2+3 \cdot 1+1) = 1.757$$

Törtburçak usuli:

$$Sum = \sum_{i=0}^n f(x_i) \cdot h = 0.724$$

Trapezsiya usuli:

$$Sum = \left(\sum_{i=1}^{n-1} f(x_i) + f(x_0) + f(x_n) \right) \cdot h = 0.812$$

Simson usuli:

$$Sum = \frac{h}{3} \left(f(x_0) + f(x_n) + 4 \left(\sum_{i=1}^{(n-1)/2} f(x_i) \right) + 2 \cdot \left(\sum_{i=2}^{n/2} f(x_i) \right) \right) = 0.635$$

2. Misol. Nyuton usuli:

2.1. $f(x) = x^3 + 2x + 1 = 0$ oralig $(-1; 0)$

$f'(x) = 3x^2 + 2 = 0$ $\varepsilon = 0,0001$

$$x_1 = -1 - \frac{f(x)}{f'(x)} = -1 - \frac{-1 - 2 + 1}{3 + 2} = -1 + 0,4 = -0,6$$

$$x_2 = -0,6 - \frac{f(-0,6)}{f'(-0,6)} = -0,6 - \frac{-0,216 - 1,2 + 1}{1,08 + 2} = -0,6 + \frac{0,416}{3,08} = -0,4649$$

$$x_3 = -0,4649 - \frac{f(-0,4649)}{f'(-0,4649)} = -0,4649 + \frac{0,0303}{2,6483} = -0,4534$$

$$x_4 = -0,4534 - \frac{f(-0,4534)}{f'(-0,4534)} = -0,4534 - \frac{-0,000006}{2,6162} = \boxed{-0,4534}$$

2.2. $f(x) = x\sqrt{x+2} - 3 = 0$. Vabari usuli

oralig $\begin{matrix} a & b \\ (1; 2) \end{matrix}$

$y = f(a)$

$$\begin{cases} \frac{x-a}{b-a} = \frac{y-f(a)}{f(b)-f(a)} \\ y=0 \end{cases}$$

$$x-a = -\frac{f(a)}{f(b)-f(a)} (b-a)$$

$$x = a - \frac{f(a)}{f(b)-f(a)} \cdot (b-a)$$

$$x_n = x_{n-1} - \frac{f(x_{n-1})}{f(b)-f(x_{n-1})} \cdot (b-x_{n-1})$$

$$x_1 = 1 - \frac{f(1)}{f(2)-f(1)} = 1 - \frac{1,7320 - 3}{4 - 3 - (1,7320 - 3)} = 1 + \frac{+1,2679}{2,2679} = 1,55906$$

$$x_2 = 1,55906 - \frac{f(1,55906)}{1 - f(1,55906)} = 1,55906 + \frac{0,05825}{0,94124} = 1,62147$$

$$X_3 = 1,62147 - \frac{f(1,62147)}{1-f(1,62147)} = 1,62147 - \frac{0,01568}{0,91431} = 1,52775$$