

1. Berilgen teńlemelerdi aralıqtı teń ekige bóliw hám Xordalar usılları járdeminde $\varepsilon=0,01$ anıqlıqta taqribiy sheshiń.

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|------------------------|-----------|-------------------------------|-----------|
| 1. $x^3+2x-5=0$ | [0;2] | 2. $e^x+2x-7=0$ | [0;2] |
| 3. $2x-3-\sin x=0$ | [0,5;2,5] | 4. $\cos x-x^3-x=0$ | [0;1] |
| 5. $x\sin x+x-1=0$ | [0;1] | 6. $x-e^x+2=0$ | [-2;-1] |
| 7. $x^3-2x^2-x+2=0$ | [1,1;2,5] | 8. $2^{-x}-x=0$ | [0;1] |
| 9. $3^x+x-6=0$ | [1;2] | 10. $x+\log_2 x-2=0$ | [1;2] |
| 11. $x+2-e^{-x}=0$ | [-1;0] | 12. $x+0,5\cdot(2,5)^x-3,5=0$ | [0,5;1,5] |
| 13. $\ln x-2+x=0$ | [1;2] | 14. $e^{2x}+2x-5=0$ | [0,5;1,5] |
| 15. $9x-2+10^{0,5x}=0$ | [0;1] | | |

2. Berilgen teńlemelerdi ırınbalar usılı járdeminde $\varepsilon=0,01$ anıqlıqta taqribiy sheshiń.

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|------------------------|-----------|----------------------------|-----------|
| 1. $x^5-x-0,2=0$ | $x_0=1$ | 2. $x^4-3x^2+75x-10000=0$ | $x_0=-20$ |
| 3. $x+2^x-2=0$ | $x_0=0,5$ | 4. $x^3-2x^2-x+2=0$ | $x_0=-2$ |
| 5. $4^x+2x=0$ | $x_0=1$ | 6. $e^x-2+x=0$ | $x_0=0$ |
| 7. $\sin x-2x=0$ | $x_0=0,1$ | 8. $x^4+x^2-x-4=0$ | $x_0=1$ |
| 9. $5^x-x^2-2=0$ | $x_0=0$ | 10. $\log_{0,5} x-x^2-1=0$ | $x_0=0,2$ |
| 11. $e^{2x}-x^2-3=0$ | $x_0=0,5$ | 12. $3^x+2x=0$ | $x_0=-1$ |
| 13. $e^{3x}+4x-6=0$ | $x_0=1$ | 14. $x^3-3x^2+5x-3=0$ | $x_0=0,5$ |
| 15. $2x^3-3x^2+4x-6=0$ | $x_0=1$ | | |

3. Berilgen sıızılıq algebralıq teńlemeler sistemaların Kramer, Gauss hám kerı matritsa usılları járdeminde sheshiń.

- | | |
|---|--|
| 1. $\begin{cases} 2x_1 - x_2 + x_3 - x_4 = 1 \\ 2x_1 - x_2 - 3x_4 = 2 \\ 3x_1 - x_3 + x_4 = -3 \\ 2x_1 + 2x_2 - 2x_3 - 5x_4 = -6 \end{cases}$ | 2. $\begin{cases} x_1 + 5x_2 = 2 \\ 2x_1 - x_2 + 3x_3 + 2x_4 = 4 \\ 3x_1 - x_2 - x_3 + 2x_4 = 6 \\ 3x_1 - x_2 + 3x_3 - x_4 = 6 \end{cases}$ |
| 3. $\begin{cases} x_1 + x_2 - x_3 - x_4 = 0 \\ x_2 + 2x_3 - x_4 = 2 \\ x_1 - x_2 - x_4 = -1 \\ -x_1 + 3x_2 - 2x_3 = 0 \end{cases}$ | 4. $\begin{cases} x_1 - 4x_2 = 2 \\ x_1 + x_2 + 2x_3 + 3x_4 = 1 \\ 2x_1 + 3x_2 - x_3 - x_4 = -6 \\ x_1 + 2x_2 + 3x_3 - x_4 = -4 \end{cases}$ |
| 5. $\begin{cases} 5x_1 + x_2 - x_4 = 9 \\ 3x_1 - 3x_2 - x_3 + 4x_4 = -1 \\ 3x_1 - 2x_3 + x_4 = -16 \\ x_1 - 4x_2 + x_4 = 0 \end{cases}$ | 6. $\begin{cases} 5x_1 - x_2 + x_3 + 3x_4 = -4 \\ x_1 + 2x_2 + 3x_3 - 2x_4 = 6 \\ 2x_1 - x_2 - 2x_3 - 3x_4 = 8 \\ 3x_1 + x_2 + x_3 + 2x_4 = 4 \end{cases}$ |
| 7. $\begin{cases} 2x_1 + x_3 + 4x_4 = 9 \\ x_1 + 2x_2 - x_3 + x_4 = 8 \\ 2x_1 + x_2 + x_3 + x_4 = 5 \\ x_1 - x_2 + 2x_3 + x_4 = -1 \end{cases}$ | 8. $\begin{cases} 4x_1 - 2x_2 + x_3 - 4x_4 = 3 \\ 2x_1 - x_2 + x_3 - x_4 = 1 \\ 3x_1 - x_3 + x_4 = -3 \\ 2x_1 + 2x_2 - 2x_3 + 5x_4 = -6 \end{cases}$ |

$$\begin{array}{ll}
9. \begin{cases} 2x_1 - 6x_2 + 2x_3 + 2x_4 = 12 \\ x_1 + 3x_2 + 5x_3 + 7x_4 = 12 \\ 3x_1 + 5x_2 + 7x_3 + x_4 = 0 \\ 5x_1 + 7x_2 + x_3 + 3x_4 = 4 \end{cases} & 10. \begin{cases} 2x_1 - x_3 - 2x_4 = -1 \\ x_2 + 2x_3 - x_4 = 2 \\ x_1 - x_2 - x_4 = 1 \\ -x_1 + 3x_2 - 2x_3 = 0 \end{cases} \\
11. \begin{cases} x_1 + x_2 + 2x_3 + 3x_4 = 1 \\ 3x_1 - x_2 - x_3 - 2x_4 = -4 \\ 2x_1 + 3x_2 - x_3 - x_4 = -6 \\ x_1 + 2x_2 + 3x_3 - x_4 = -4 \end{cases} & 12. \begin{cases} x_1 + 5x_2 + 3x_3 - 4x_4 = 20 \\ 3x_1 + x_2 - 2x_3 = 9 \\ 5x_1 + 7x_2 + 10x_4 = -9 \\ 3x_2 - 5x_3 = 1 \end{cases} \\
13. \begin{cases} x_1 + 2x_2 + 3x_3 - 2x_4 = 6 \\ x_1 - x_2 - 2x_3 - 3x_4 = 8 \\ 3x_1 + 2x_2 - x_3 + 2x_4 = 4 \\ 2x_1 - 3x_2 + 2x_3 + x_4 = -8 \end{cases} & 14. \begin{cases} 2x_1 + x_2 - 5x_3 + x_4 = 8 \\ x_1 - 3x_2 - 6x_4 = 9 \\ 2x_2 - x_3 + 2x_4 = -5 \\ x_1 + 4x_2 - 7x_3 + 6x_4 = 0 \end{cases} \\
& 15. \begin{cases} x_1 + 2x_2 + 3x_3 + 4x_4 = 5 \\ 2x_1 + x_2 + 2x_3 + 3x_4 = 1 \\ 3x_1 + 2x_2 + x_3 + 2x_4 = 1 \\ 4x_1 + 3x_2 + 2x_3 + x_4 = -5 \end{cases}
\end{array}$$

4. Tóمندegi berilgen teńlemeler sistemaların iteratsiya usılı járdeminde $\varepsilon=0,001$ anıqlıqta sheshiń.

$$\begin{array}{ll}
1. \begin{cases} 10x_1 - 2x_2 + x_3 = 24 \\ x_1 + 4x_2 + 3x_3 = 8 \\ 2x_1 + x_2 - 8x_3 = -9 \end{cases} & 2. \begin{cases} 4x_1 - x_2 + 2x_3 = 7 \\ 2x_1 + 5x_2 - x_3 = 6 \\ x_1 + 2x_2 + 7x_3 = 2 \end{cases} \\
3. \begin{cases} x_1 + 0,1x_2 - 0,25x_3 = 1 \\ 0,3x_1 + 2x_2 + x_3 = 4 \\ x_1 - 0,4x_2 + 4x_3 = 3,5 \end{cases} & 4. \begin{cases} 3x_1 + 0,5x_2 - x_3 = 3 \\ -0,7x_1 + 5x_2 + 2x_3 = -2,5 \\ x_1 + 0,5x_2 + x_3 = 1,8 \end{cases} \\
5. \begin{cases} 7x_1 + 2x_2 - x_3 = 0,7 \\ -2x_1 + 6x_2 + 1,5x_3 = 1 \\ 1,2x_1 + 1,7x_2 + 4x_3 = 0,6 \end{cases} & 6. \begin{cases} 5x_1 + 2x_2 - 0,6x_3 = -4 \\ x_1 + 3x_2 + 0,9x_3 = 5 \\ 1,3x_1 + x_2 + 7x_3 = 1 \end{cases} \\
7. \begin{cases} 2x_1 + 0,5x_2 - 0,6x_3 = 9 \\ -0,8x_1 + 3x_2 + x_3 = 3 \\ 2x_1 + x_2 + 5x_3 = 4 \end{cases} & 8. \begin{cases} 12x_1 - 2x_2 + 3x_3 = 19 \\ 2x_1 + 7x_2 - x_3 = -6 \\ 3x_1 - x_2 + 6x_3 = 7 \end{cases} \\
9. \begin{cases} 8x_1 - x_2 + 5x_3 = 11 \\ x_1 + 4x_2 - 2x_3 = 6 \\ 2x_1 + x_2 + 5x_3 = -4 \end{cases} & 10. \begin{cases} x_1 + 0,1x_2 - 0,3x_3 = 1,3 \\ x_1 + 4x_2 - 3x_3 = 1 \\ 2x_1 + x_2 + 5x_3 = 2 \end{cases}
\end{array}$$

$$\begin{array}{ll}
11. \begin{cases} 3x_1 - x_2 - x_3 = -5 \\ x_1 + 6x_2 - 3x_3 = 4 \\ 2x_1 - 2x_2 + 7x_3 = 3 \end{cases} & 12. \begin{cases} 12x_1 - x_2 + 2x_3 = 19 \\ x_1 + 6x_2 + 3x_3 = 7 \\ 4x_1 + x_2 + 9x_3 = 23 \end{cases} \\
13. \begin{cases} 5x_1 + 2x_2 - x_3 = 8 \\ x_1 + 10x_2 - 7x_3 = 5 \\ 3x_1 + x_2 + 8x_3 = 7 \end{cases} & 14. \begin{cases} 14x_1 + 3x_2 + x_3 = 31 \\ 3x_1 + 8x_2 - x_3 = 17 \\ 7x_1 + x_2 + 11x_3 = 24 \end{cases} & 15. \begin{cases} 6x_1 + x_2 + 2x_3 = 7 \\ x_1 + 4x_2 + 2x_3 = 10 \\ 5x_1 + x_2 + 14x_3 = 18 \end{cases}
\end{array}$$

5. Tómenđegi anıq integrallardı tuwrımúyeshlik, trapetsiya hám Simpson usılları járdeminde esaplań (n=10).

$$\begin{array}{lll}
1. \int_0^1 x^2 \sin x^2 dx & 2. \int_1^2 (x^2 + 1)e^{\sin x} dx & 3. \int_0^1 (x^2 - 3x + 4) \cdot 2^x dx \\
4. \int_1^e (1 + \ln x) \sin \frac{x}{2} dx & 5. \int_0^1 (x^2 - x - 8)e^{x^2} dx & 6. \int_1^2 (x + 5) \ln(x^2 + 1) dx \\
7. \int_0^1 (1 + \cos x) \log_2(1 + x) dx & 8. \int_1^3 (2x - 7)(1 - e^{-x}) dx & \\
9. \int_1^2 (\ln x + 1) x e^x dx & 10. \int_0^1 (e^x + e^{-x}) \cdot 3^x dx & \\
11. \int_1^2 e^{x^2} \sin 4x dx & 12. \int_2^3 (1 - 2x + x^3)(e^{0.1x} - e^{-x}) dx & \\
13. \int_0^1 (3x + \sin x) \cos 2x^2 dx & 14. \int_0^1 2^{1-x^2} \cdot \operatorname{tg} x dx & \\
15. \int_0^1 \log_2(1 + x) \cdot 0.5^x dx & &
\end{array}$$

6. Tómenđegi Koshi máselelerin Eyler usılında sheshiń (n=10; h=0.1).

$$\begin{array}{ll}
1. y' = 2x - e^{-x} + 1, \quad y(0) = 1 & 2. y' = 2x \sin x + x^2 \cos x, \quad y(\pi) = 0 \\
3. y' = e^x + y, \quad y(0) = 1 & 4. y' = x + 1 - y, \quad y(0) = 1 \\
5. y' = e^x + y, \quad y(0) = 0 & 6. y' = (x + 1)^2 - y, \quad y(0) = 1 \\
7. y' = e^x + \cos x - \sin x + y, \quad y(0) = 0 & 8. y' = x^{-1} - 1 - \ln x - x + y, \quad y(1) = -1 \\
9. y' = 1 + y + (1 + x) \ln x, \quad y(1) = 0 & 10. y' = y \cos x, \quad y(0) = 1 \\
11. y' = 1 - y \sin x, \quad y(0) = e & 12. y' = 2x - x^2 + (1 - x) \ln x + 1 + y, \quad y(1) = 1 \\
13. y' = y - e^{-x}, \quad y(0) = 1 & 14. y' = y + e^{-x}, \quad y(0) = 0 \\
15. y' = 2x e^{-x} - y, \quad y(0) = 0 &
\end{array}$$

7. Tómenđegi Koshi máselelerin Runge-Kutta usılında sheshiń (n=10; h=0.1).

$$\begin{array}{ll}
1. \begin{cases} y_1' = y_1 - 2y_2 - 1 \\ y_2' = y_1 + y_2 - 3x + 1 \end{cases} \begin{cases} y_1(0) = 1 \\ y_2(0) = -1 \end{cases} & 2. \begin{cases} y_1' = 2(y_2 - 1) \\ y_2' = -y_1 + xy_2 + 1 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = 2 \end{cases} \\
3. \begin{cases} y_1' = y_1 - 2y_2 + 2x + 1 \\ y_2' = -2y_1 + y_2 - x - 1 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = 1 \end{cases} & 4. \begin{cases} y_1' = y_1 + y_2 \\ y_2' = y_1 + (1 - x)y_2 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = 1 \end{cases}
\end{array}$$

$$\begin{array}{ll}
5. \begin{cases} y_1' = -y_1 + xy_2 + x - 1 \\ y_2' = \frac{1}{x}y_1 - y_2 + \frac{1}{x} + 2 \end{cases} \begin{cases} y_1(1) = 0 \\ y_2(1) = 2 \end{cases} & 6. \begin{cases} y_1' = y_1 + y_2 \\ y_2' = y_1 - y_2 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = 1 \end{cases} \\
7. \begin{cases} y_1' = -y_1 - \frac{2}{3}y_2 + \frac{1}{3} \\ y_2' = -6y_1 + 2y_2 + 8 \end{cases} \begin{cases} y_1(0) = 3 \\ y_2(0) = 2 \end{cases} & 8. \begin{cases} y_1' = -e^{-x}y_2 \\ y_2' = e^x y_1 - y_2 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = -1 \end{cases} \\
9. \begin{cases} y_1' = -7y_1 + y_2 \\ y_2' = -2y_1 - 5y_2 \end{cases} \begin{cases} y_1(0) = 1 \\ y_2(0) = 2 \end{cases} & 10. \begin{cases} y_1' = -y_1 + y_2 \\ y_2' = y_1 - (x+1)y_2 \end{cases} \begin{cases} y_1(0) = 0 \\ y_2(0) = 1 \end{cases} \\
11. \begin{cases} y_1' = 2y_1 - y_2 \\ y_2' = 4y_1 - 2y_2 - 2 \end{cases} \begin{cases} y_1(0) = 1 \\ y_2(0) = 1 \end{cases} & 12. \begin{cases} y_1' = -y_1 + y_2 + 2(e^{-x} - x) \\ y_2' = y_1 + y_2 - 2x(1 + e^{-x}) \end{cases} \begin{cases} y_1(0) = 1 \\ y_2(0) = 1 \end{cases} \\
13. \begin{cases} y_1' = y_1 + y_2 - x^2 + 1 \\ y_2' = -y_1 + xy_2 \end{cases} \begin{cases} y_1(0) = -1 \\ y_2(0) = 1 \end{cases} & 14. \begin{cases} y_1' = y_1 - y_2 + 2(x-1) \\ y_2' = y_2 - y_1 + 2(x+1) \end{cases} \begin{cases} y_1(0) = 1 \\ y_2(0) = -1 \end{cases} \\
15. \begin{cases} y_1' = -y_1 + 2y_2 - 1 \\ y_2' = y_1 - y_2 - x + 3 \end{cases} \begin{cases} y_1(1) = 1 \\ y_2(1) = 2 \end{cases} &
\end{array}$$

8. Tóمندegi shegaralıq máselelerdi ápiwayı progonka usılı járdeminde sheshiń.

$$1. y''(x) + y(x) = x^2 + 2x - 1 \\
\begin{cases} y'(0) + y(0) = -1 \\ y'(1) - y(1) = 4 \end{cases}$$

$$2. y''(x) - y(x) = -2e^{-x} \\
\begin{cases} y(0) = 0 \\ y'(1) = 0 \end{cases}$$

$$3. y''(x) + 2y(x) = 2(\cos x + x \sin x) \\
\begin{cases} y'(0) + y(0) = 0 \\ y'(\pi) + y(\pi) = -2\pi \end{cases}$$

$$4. y''(x) + 2y(x) = 2x^2 \\
\begin{cases} y'(0) + y(0) = -1 \\ y'(1) + y(1) = 2 \end{cases}$$

$$5. y''(x) - \frac{3}{x}y(x) = 4 - \frac{3}{x} - 3x^2 \\
\begin{cases} y'(1) - 2y(1) = -1 \\ y'(2) - y(2) = 4 \end{cases}$$

$$6. y''(x) - 4y(x) = -4e^{-2x} \\
\begin{cases} y(0) = 1 \\ y(1) = \frac{2}{e^2} \end{cases}$$

$$7. y''(x) + y(x) = -2 \sin x \\
\begin{cases} y(0) = 0 \\ y\left(\frac{\pi}{2}\right) = 0 \end{cases}$$

$$8. y''(x) + \frac{1}{x}y(x) = x + 1 \\
\begin{cases} y'(1) + y(1) = 1 \\ y'(2) - y(2) = 1 \end{cases}$$

$$9. y''(x) + xy(x) = \frac{x^3}{2} + x^2 + x + 1 \\
\begin{cases} y'(0) + y(0) = 2 \\ y'(1) - y(1) = -0.5 \end{cases}$$

$$10. y''(x) + y(x) = 2xe^x \\
\begin{cases} y(0) = -1 \\ y(1) = 0 \end{cases}$$

$$11. y''(x) + \frac{1}{\ln x} y(x) = x + \frac{1}{x}$$

$$\begin{cases} y'(2) - 0.5y(2) = 1 \\ y'(e) - y(e) = e - 2 \end{cases}$$

$$11. y''(x) + \frac{1}{\ln x} y(x) = x + \frac{1}{x}$$

$$\begin{cases} y'(2) - 0.5y(2) = 1 \\ y'(e) - y(e) = e - 2 \end{cases}$$

$$13. y''(x) + y(x) = 2\cos x$$

$$\begin{cases} y'(0) = 1 \\ y(\pi) = 0 \end{cases}$$

$$15. y''(x) - 2y'(x) = (3 - x^2)e^x$$

$$\begin{cases} y(0) = -1 \\ y(1) = 0 \end{cases}$$

$$12. y''(x) + y(x) = 2e^{1-x}$$

$$\begin{cases} y'(1) - y(1) = -2 \\ y'(2) + y(2) = 0 \end{cases}$$

$$12. y''(x) + y(x) = 2e^{1-x}$$

$$\begin{cases} y'(1) - y(1) = -2 \\ y'(2) + y(2) = 0 \end{cases}$$

$$14. y''(x) + xy'(x) - y(x) = x + \frac{1}{x}$$

$$\begin{cases} y'(1) + y(1) = 1 \\ y'(e) - 0.5y(e) = 1.7 \end{cases}$$

9. Tóمندegi shegaralıq máselelerdi differentzial progonka usılı járdeminde sheshiń.

$$1. y''(x) - 0.5xy'(x) + y(x) = 3$$

$$\begin{cases} y'(0) - 2y(0) = -2 \\ y'(1) - y(1) = 0 \end{cases}$$

$$2. y''(x) + xy'(x) = 2(1 + x^2)$$

$$\begin{cases} y'(1) + y(1) = 2 \\ y'(2) - y(2) = 1 \end{cases}$$

$$3. y''(x) + y'(x) + y(x) = \cos x$$

$$\begin{cases} y'(0) + y(0) = 1 \\ y'(\frac{\pi}{2}) + y(\frac{\pi}{2}) = 1 \end{cases}$$

$$4. y''(x) + y'(x) - \frac{1}{x}y(x) = x + 2$$

$$\begin{cases} y'(1) - y(1) = 1 \\ y'(2) - \frac{1}{2}y(2) = 2 \end{cases}$$

$$5. y''(x) + y'(x) = -2\sin x$$

$$\begin{cases} y(0) = 1 \\ y'(\pi) - y(\pi) = 0 \end{cases}$$

$$6. y''(x) - xy'(x) - xy(x) = -2e^{-x}$$

$$\begin{cases} y(0) = 0 \\ y'(1) = 0 \end{cases}$$

$$7. y''(x) + xy'(x) = (2 + x^2)\cos x$$

$$\begin{cases} y(0) + y'(0) = 0 \\ y(\frac{\pi}{2}) + y'(\frac{\pi}{2}) = \frac{\pi + 2}{2} \end{cases}$$

$$8. y''(x) - \frac{2}{x}y'(x) + \frac{1}{x^2}y(x) = 2\left(x + \frac{1}{x^2}\right)$$

$$\begin{cases} y'(1) - y(1) = 1 \\ y'(2) - y(2) = 1 \end{cases}$$

$$9. y''(x) + xy'(x) - y(x) = x + \frac{1}{x}$$

$$\begin{cases} y'(1) + y(1) = 1 \\ y'(e) - 0.5y(e) = 1.7 \end{cases}$$

$$10. y''(x) + \frac{x}{2}y'(x) - y(x) = x + 2$$

$$\begin{cases} y(1) = -1 \\ y(2) = 0 \end{cases}$$

$$11. y''(x) + \frac{1}{x^2} y(x) = \frac{3}{x^3}$$

$$\begin{cases} y'(1) + y(1) = 0 \\ y'(2) + y(2) = 0.25 \end{cases}$$

$$13. y''(x) + \frac{1}{\ln x} y(x) = x + \frac{1}{x}$$

$$\begin{cases} y'(2) - 0.5y(2) = 1 \\ y'(e) - y(e) = e - 2 \end{cases}$$

$$15. y''(x) - 4y(x) = -4e^{-2x}$$

$$\begin{cases} y(0) = 1 \\ y(1) = \frac{2}{e^2} \end{cases}$$

$$12. y''(x) - 2y'(x) = (3 - x^2)e^x$$

$$\begin{cases} y(0) = -1 \\ y(1) = 0 \end{cases}$$

$$14. y''(x) + \frac{1}{x} y(x) = x + 1$$

$$\begin{cases} y'(1) + y(1) = 1 \\ y'(2) - y(2) = 1 \end{cases}$$

10. $\int_0^1 \frac{x^2}{2} dx$ integraldı trapetsiya formulasi jrdeminde esapla

$$\frac{1}{4}$$

$$0$$

$$1$$

$$-2$$

11. $\int_{-\pi}^{2\pi} \sin^2 x dx$ integraldı trapetsiya formulasi jrdeminde esapla

$$1$$

$$0$$

$$2$$

$$3$$

12. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos^2 x dx$ integraldı trapetsiya formulasi jrdeminde esapla

$$\frac{\pi}{4}$$

$$\pi$$

$$\frac{\pi}{8}$$

$$\frac{\pi}{2}$$

13. $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \operatorname{ctg} x dx$ integraldı trapetsiya formulasi jrdeminde esapla

$$1$$

$$\pi$$

$$\frac{\pi}{8}$$

$$0$$

14. $\int_a^b x dx$ integraldı trapetsiya formulasi járdeminde esaplań

$$\frac{a+b}{2}(b-a)$$

$$\frac{1}{4}$$

$$\frac{a}{2}(b-a)$$

$$\frac{b}{2}$$

15. $\int_{-3}^3 (x-3)^2 dx$ integraldı trapetsiya formulasi járdeminde esaplań

$$100$$

$$108$$

$$-\frac{15}{2}$$

$$96$$

16. $\int_{-1}^1 |x| \cdot x dx$ integraldı trapetsiya formulasi járdeminde esaplań

$$1$$

$$-1$$

$$2$$

$$0$$

17. Nyutonning Sızıqlı interpolýatsion formalasiga tegishli noqatni tabıń $y = 1 + \frac{1}{2}(x-1)$

$$(1,1)$$

$$(1,2)$$

$$(1,3)$$

$$(1,4)$$

18. Nyutonning Sızıqlı interpolýatsion formalasiga tegishli noqatni tabıń $y = 2 + \frac{3}{2}(x-4)$

$$(2,0)$$

$$(2,-1)$$

$$(1,0)$$

$$(0,2)$$

19. Tómenдеgi noqatlardan qaysi biri Nyutonning interpolýatsion formalasiga tegishli emas

$$y = 1 + \frac{3}{2}(x-2)$$

$$(2,1)$$

$$(4,4)$$

$$(0,1)$$

$$(1, -\frac{1}{2})$$

20. Tóمندegi noqatlardan qaysi biri Nyutonning interpolyatsion formulasini qanoatlantiradi $y = 1 + \frac{1}{2}(x + 2)$

$$(0,1)$$

$$(1,2)$$

$$(2,2)$$

$$(0,2)$$

21. Nyutonning Sızıqlı interpolyatsion formulasini qanaatlantırıwshı noqatni tabıń $y = 0,1 + \frac{0,3}{2}(x - 2)$

$$(2,1)$$

$$(2, 0,1)$$

$$(0,1)$$

$$(1, -\frac{1}{2})$$

22. $y' = f(x, y)$, $y(x_0) = y_0$ hám $x_i = x_0 + i \cdot h$ Berilgenda differentsial teńlemenı sheshimin Eyler usılıni qo'llaydigan formulani anıqlań

$$y_{i+1} = y_0^2 + h \cdot f(x_i, y_i)$$

$$y_{i+1} = y_i + h \cdot f(x_i, y_i)$$

$$y_{i+1} = h \cdot f(x_i, y_i)$$

$$y_{i+1} = y_i + f(x_i, y_i)$$

23. $y' = x + y$, $y(1) = 2$, $h = 0,1$ Berilgen. y_2 ni Eyler usılıda tabıń

$$2,64$$

$$2,3$$

$$2,34$$

$$2,46$$

24. $y' = x^2 + y$, $x_0 = 0$, $y_0 = 1$, $x_1 = 1$, $y_1 = 2$ Berilgenda h ni Eyler usılıda tabıń

$$0,1$$

$$1$$

$$0,2$$

$$2$$

25. $f(x) = 0$ teńlemenı $[a, b]$ da sheshimin barlıgı

$$f(a)f(b) = 0$$

$$f(a) = 0$$

$$f(a)f(b) < 0$$

$$f(a)f(b) > 0$$

26. Lagranj interpolyatsion formulasidan paydalanıp, to'g'ri sızıq teńlamasını keltirib chiqarish ushın neshe noqat kerak bo'ladi?

$$1$$

$$2$$

$$3$$

$$4$$

27. $f(x) = 0$ teńlemenı $[a, b]$ da sheshimin barlıgı

$$f(a)f(b) = 0$$

$$f(a) = 0$$

$$f(a)f(b) < 0$$

$$f(a)f(b) > 0$$

28. Lagranj interpolatsion formulasidan paydalanıp, to'g'ri sızıq teńlamasini keltirib chiqarish ushın neshe noqat kerak bo'ladi?

1

2

3

4

29. Lagranj interpolatsion formulasini uch noqat ushın yozsak qanday teńleme kelib chiqadi

to'g'ri sızıq

parabola

kubik teńleme

hech qanday teńlama

30. (1;1) hám (2;2) noqatlar ushın Lagranj interpolatsion teńlamasini jazıń

$$L(x) = \frac{x-2}{2} + \frac{x+1}{1} \cdot 2$$

$$L(x) = x - 2 + x + 1$$

$$L(x) = x - 2 + x - 1$$

$$L(x) = -(x-2) + (x-1) \cdot 2$$

31 (a, f(a)) hám (b, f(b)) noqatlar ushın Lagranj interpolatsion formulasini jazıń

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

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

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

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

32. $\int_0^{\frac{\pi}{2}} \sin^2 x dx$ integraldı to'rtburchak formulasi járdeminde esaplań

$$\frac{\pi}{4}$$

2

1

0

33. $\int_{\pi}^{2\pi} \sin 2x dx$ integraldı to'rtburchak formulasi járdeminde esaplań

1

2

0

3

34. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx$ integrald π to'rtburchak formulasi j π rdeminde esapla π

$\frac{\pi}{4}$
 $\frac{\pi}{1}$
 $\frac{\pi}{2}$

35. $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos^2 x dx$ integrald π to'rtburchak formulasi j π rdeminde esapla π

$\frac{\pi}{4}$
 $\frac{\pi}{0}$
 $\frac{\pi}{8}$

36. $\int_0^1 x^2 dx$ integrald π to'rtburchak formulasi j π rdeminde esapla π

0
 $\frac{1}{4}$
2
-1

37. $f(x) = xe^x$, $\Delta f = 0,2e$, $x_0 = 1$ Berilgenda, Δx - absolyut xatoni tabi π

0,1
0,01
0,2
1

38. $f(x) = e^{-x}$, $\Delta f = 0,01e$, $x_0 = -1$ Berilgenda, Δx - absolyut xatoni tabi π

1
0,1
0,01
0,02

39. $f(x) = \sin x$, $\Delta f = \frac{\pi}{15}$, $x_0 = \pi$ Berilgenda, Δx - absolyut xatoni tabi π

$$\frac{\pi}{6}$$

$$\frac{\pi}{3}$$

$$\frac{\pi}{20}$$

$$\frac{\pi}{15}$$

40. $\Delta f = -\frac{\pi^2}{15}$, $f(x) = x \sin x$, $x_0 = \pi$ Berilgenda, Δx - absolyut xatoni tabiń

$$0 \frac{\pi}{15}$$

$$-\frac{\pi}{15}$$

$$\frac{\pi}{3}$$

$$\frac{\pi}{2}$$

41. $\Delta f = -\frac{\pi}{20}$, $f(x) = x \operatorname{ctgx}$, $x_0 = \frac{\pi}{2}$ Berilgenda, Δx - absolyut xatoni tabiń

$$-0,1$$

$$0,1$$

$$0,01$$

$$0,1 - \frac{\pi}{2}$$

42. $\Delta f = -0,01$, $f(x) = \ln x$, $x_0 = -1$ Berilgenda, Δx - absolyut xatoni tabiń

$$-0,1$$

$$0,01$$

$$0,001$$

$$-0,01$$

43. $\Delta f = -0,006$, $f(x) = x \ln x$, $x_0 = e^2$ Berilgenda, Δx - absolyut xatoni tabiń

$$0,003$$

$$0,001$$

$$-0,002$$

0,01

44. $\Delta f = 0,1$, $f(x) = x \cos x$, $x_0 = -\pi$ Berilgenda, Δx - absolyut xatoni tabin

0,01

0,1

- 0,01

- 0,02

45. Nyutonning Sızıqlı interpolýatsion formulasini qanaatlandırıwshı noqatni tabin
 $y = 1 + (x - 1)$

(2,1)

(1,1)

(3,1)

$(1, -\frac{1}{2})$

46. Nyutonning Sızıqlı interpolýatsion formulasini qanaatlandırıwshı noqatni tabin

$$y = 4 + \frac{2}{5}(x - 3)$$

(0,2)

(3,2)

(5,6)

47. Nyutonning Sızıqlı interpolýatsion formulasini tegishli noqatni anıqlań $y = 3 + 2(x + 1)$

(0,3)

(2, 1)

(1,2)

(-1,3)

48. Nyutonning Sızıqlı interpolýatsion formulasini qanaatlandırıwshı noqatni tabin

$$y = 1 + \frac{1}{3}(x + 1)$$

(0,1)

(2,2)

$(0, -\frac{1}{2})$

(1,2)

49. Nyutonning Sızıqlı interpolýatsion formulasiga tegishli bo'lmagan noqatni tabin

$$y = 2 + \frac{2}{5}(x - 3)$$

(0,1)

(3,2)

(8,4)

(-2,0)

50. Tóمندegi noqatlardan qaysi biri Sızıqlı Nyuton interpolýatsion teńlamasini

qanoatlantirmaydi $y = 2 + \frac{2}{3}(x + 1)$

(2,4)

(1,2)

(-1,2)

(5,6)

51. Tóمندegi noqatlardan qaysi biri Sızıqlı Nyuton interpolyatsion teńlamasını

qanoatlantırmaydı $y = 1 + \frac{1}{3}(x - 1)$

(1,1)

(-2,0)

(0,1)

$(2, 1\frac{1}{3})$

52. $\int_0^9 \sqrt{x} dx$ integraldı trapetsiya formulasi járdeminde esaplań

27

21

13,5

10,5

53. $\int_e^{e^2} \ln^2 x dx$ integraldı trapetsiya formulasi járdeminde esaplań

$\frac{5}{2}(e^2 - e)$

e^2

$\frac{3}{2}(e^2 - e)$

$\frac{1}{2}(e^2 - e)$

54. $\int_e^{e^3} \frac{1}{\ln x} dx$ integraldı trapetsiya formulasi járdeminde esaplań

$e^3 - e$

e^3

$\frac{2}{3}(e^3 - e)$

$\frac{1}{2}(e^3 - e)$

55. $\int_a^b \frac{1}{\ln x} dx$ integraldı trapetsiya formulasi járdeminde esaplań

$\frac{\ln a + \ln b}{2 \ln a \ln b} (b - a)$

$\ln a \ln b$

$\ln ab$

$\ln \frac{a}{b}$

56. $\int_0^1 e^{x^2} dx$ integraldı trapetsiya formulasi járdeminde esaplań

$$\frac{1}{4}$$

$$0$$

$$\frac{e+1}{2}$$

$$-2$$

57. $y = e^x$, $x_0 = 1$, $\Delta x = 0,1$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,1$$

$$0,01$$

$$0,2$$

$$0,001$$

58. $y = \ln x$, $x_0 = e$, $\Delta x = 0,01e$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,01e$$

$$0,1e$$

$$0,1$$

$$0,01$$

59. $y = xe^x$, $x_0 = 1$, $\Delta x = 0,1$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,02$$

$$0,2$$

$$0,1$$

$$0,01$$

60. $\Delta f = 0,01e$, $f(x) = e^{-x}$, $x_0 = -1$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,1$$

$$0,01$$

$$0,2$$

$$0,001$$

61. $\Delta f = 0,001$, $f(x) = \sin x$, $x_0 = \frac{\pi}{2}$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,01$$

$$0,01 - \frac{\pi}{2}$$

$$0,001$$

$$0,1 - \frac{\pi}{2}$$

62. $\Delta y = 0,1$, $y = x^m$, $x_0 = 1$ Berilgenda, δ_y - nisbiy xatoni tabiń

$$0,1$$

$$0,01$$

$$0,001$$

$$0,2$$

63. Tómendegilardan qaysi biri birinshi tártipli Shekli ayirmanı ifodalaydı

$$\Delta^2 y_i = \Delta y_{i+1} - \Delta y_i$$

$$\Delta y_i = y_{i+1} - y_i$$

$$y_i = y_2 - y_1$$

$$\Delta y_i = \Delta y_{i+1} - \Delta y_i$$

64. Nyutonning birinshi interpolatsion formulasi qanday ko'rinishda ifodalanadi

$$y = a_0 + a_1(x - x_0) + a_2(x - x_1) + \dots + a_n(x - x_0)(x - x_1) \dots (x - x_n)$$

$$y = y_0 + \frac{\Delta y_0}{1! \cdot h}(x - x_0) + \frac{\Delta^2 y_0}{2! h^2}(x - x_0)(x - x_1) + \dots$$

$$+ \frac{\Delta^n y_0}{n! h^n}(x - x_0)(x - x_1) \dots (x - x_{n-1})$$

$$y = y_0 + \Delta y_0(x - x_0) + \Delta^2 y_0(x - x_0)(x - x_1) + \dots$$

$$+ \Delta^n y_0(x - x_0)(x - x_1) \dots (x - x_{n-1})$$

$$y = y_0 + \frac{\Delta y_0}{1!}(x - x_0) + \frac{\Delta^2 y_0}{2!}(x - x_0)(x - x_1) + \dots$$

$$+ \frac{\Delta^n y_0}{n!}(x - x_0)(x - x_1) \dots (x - x_{n-1})$$

65. Nyutonning ekinshi interpolatsion formulasi qanday ko'rinishda ifodalanadi

$$y = y_n + \frac{\Delta y_{n-1}}{1! \cdot h}(x - x_n) + \frac{\Delta^2 y_{n-2}}{2! h^2}(x - x_n)(x - x_{n-1}) + \dots$$

$$+ \frac{\Delta^n y_0}{n! h^n}(x - x_n)(x - x_{n-1}) \dots (x - x_1)$$

$$y = y_0 + \Delta y_0(x - x_0) + \Delta^2 y_0(x - x_0)(x - x_1) + \dots$$

$$+ \Delta^n y_0(x - x_0)(x - x_1) \dots (x - x_{n-1})$$

$$y = y_0 + \frac{\Delta y_0}{1!}(x - x_0) + \frac{\Delta^2 y_0}{2!}(x - x_0)(x - x_1) + \dots$$

$$+ \frac{\Delta^n y_0}{n!}(x - x_0)(x - x_1) \dots (x - x_{n-1})$$

$$y = a_0 + a_1(x - x_0) + a_2(x - x_1) + \dots + a_n(x - x_0)(x - x_1) \dots (x - x_n)$$

66. $\Delta f = 0,001$, $f(x) = \sin x$, $x_0 = \frac{\pi}{2}$ Berilgenda, δ_y - nisbiy xatoni tabii

0,01

0,01 - $\frac{\pi}{2}$

0,001

$0,1 - \frac{\pi}{2}$

67. $\Delta y = 0,1$, $y = x^m$, $x_0 = 1$ Berilgenda, δ_y - nisbiy xatoni tabiń

0,1

0,01

0,001

0,2

68. $\Delta S = 0,01$, $S = \pi r^2$, $r_0 = 0,1$ Berilgende, δ_y - sbiy xatoni tabiń

$\frac{1}{2\pi}$

$\frac{1}{\pi}$

$\frac{1}{\pi}$

$\frac{\pi}{2}$

0,1

$\frac{\pi}{2}$

$\frac{\pi}{2}$

69. $\Delta f = 0,02$, $f(x) = x$, $x_0 = 2$ Berilgenda, δ_y - nisbiy xatoni tabiń

0,1

0,2

0,01

0,02

70. $\Delta f = 0,002$, $f(x) = 2 \ln^2 x$, $x_0 = e$ Berilgende, δ_y - nisbiy xatoni tabiń

0,01

0,02

0,001

0,002

71. $\Delta f = 0,01 \cdot \sqrt{3}$, $f(x) = \cos x$, $x_0 = \frac{\pi}{6}$ Berilgende, δ_y - nisbiy xatoni tabiń

0,02

$0,1 \cdot \sqrt{3}$

0,01

$0,01 \cdot \sqrt{3}$

72. $(a, f(a))$ hám $(b, f(b))$ noqatlar ushın Lagranj interpolyatsion formulasini jazıń

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

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

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

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