

Sorawlar dizimi

Qánigelik:	<u>Matematika</u>
Oqıw tili:	o'zbek
Kurs:	<u>3</u>
Semestr:	<u>5</u>
Pán:	Analizning nostandart masalalari
Oqıw jılı:	<u>2024-2025</u>

1. Teng o'lchovli uzluksizlik va uzluksizlikning moduli
2. Funktsiyaning bosh qismini ajratish va uni limitlarni hisoblashga tadbiqu
3. Vallis formulasi va misollar, uning tadbiqulari bilan bog'liqligi
4. Funktsiyalarning grafiklarini yasash
5. Chekli va cheksiz yig'indilar uchun Gelder tengsizligi
6. Chekli va cheksiz yig'indilar uchun Minkovskiy tengsizligi
7. Yunga tengsiligi
8. Rimannig dzeta funktsiyasi va tub sonlar
9. Stirling formulasi va misollar, uning tadbiqui bilan bog'liqligi
10. Asimptotik darajali qatorlar, hossalari
11. Shartli ekstremum uchun Lagranj metodi
12. Lagranj metodining geometrik interpretatsiyasi
13. Yarim uzluksiz funktsiyalar va ularning hossalari
14. Qavariq funktsiyaning tarifi va maksimum printsipi
15. Qavariq funktsiyalarning asosiy hossalari va kriteriyalari
16. Qavariq funktsiyalar uchun Iensen tengsizligi
17. Haqiqiy xosmas integrallarini chegirmalar yordamida hisoblash

1. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \dots + n(n+1) = \frac{n(n+1)(n+2)}{3}$$

1. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$\frac{1}{1 \cdot 5} + \frac{1}{5 \cdot 9} + \frac{1}{9 \cdot 13} + \dots + \frac{1}{(4n-3)(4n+1)} = \frac{n}{4n+1}$$

2. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$1^2 + 3^2 + 5^2 + \dots + (2n-1) \cdot 2 = \frac{n(2n-1)(2n+1)}{3}$$

3. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$1 - 2^2 + 3^2 - 4^2 + \dots + (-1)^n \cdot n^2 = (-1)^{n-1} \cdot \frac{n(n+1)}{2}$$

4. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots - \frac{1}{2n} = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{2n}$$

5. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$\frac{1^2}{1 \cdot 3} + \frac{2^2}{3 \cdot 5} + \dots + \frac{n^2}{(2n-1)(2n+1)} = \frac{n(n+1)}{2(2n+1)}$$

6. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$\left(1 - \frac{1}{4}\right) \left(1 - \frac{1}{9}\right) \dots \left(1 - \frac{1}{(n+1)^2}\right) = \frac{n+2}{2n+2}$$

7. Matematik induksiya usulidan foydalanib, quyidagi tenglikning istalgan natural son uchun o'rinli bo'lishini isbotlang:

$$1 \cdot 2 \cdot 3 + 2 \cdot 3 \cdot 4 + 3 \cdot 4 \cdot 5 + \dots + n(n+1)(n+2) = \frac{n}{4}(n+1)(n+2)(n+3)$$

8. Tarif yordamida hisoblang $\int_0^{\frac{\pi}{2}} \sin x dx$;

9. Tarif yordamida hisoblang $\int_0^x \cos t dt$;

10. Tarif yordamida hisoblang

$$\int_1^2 \frac{dx}{x^2} ;$$

11. Integralni hisoblang

$$\int_0^{10\pi} \sqrt{1 - \cos 2x} dx$$

12. Integralni hisoblang

$$\int_0^a x^2 \sqrt{a^2 - x^2} dx$$

13. Integralni hisoblang $\int_{-1}^2 x^3 dx$

14. Integralni hisoblang $\int_1^4 \frac{dx}{\sqrt[3]{x}}$

15. Integralni hisoblang $\int_1^2 (x^2 - 2x + 3) dx$

16. Integralni hisoblang $\int_{-1}^1 (x^3 - 2x^2 + x - 1) dx$

17. Integralni hisoblang $\int_0^1 (\sqrt{x} + \sqrt[3]{x^2}) dx$

18. Integralni hisoblang $\int_0^{\pi} \sin x dx$

19. Integralni hisoblang $\int_{1/\sqrt{3}}^{\sqrt{3}} \frac{dx}{1 + x^2}$

20. Integralni hisoblang $\int_{-1/2}^{1/2} \frac{dx}{\sqrt{1 - x^2}}$

21. Integralni hisoblang $\int_{-\pi/4}^0 \frac{dx}{\cos^2 x}$

22. Integralni hisoblang $\int_2^9 \sqrt[3]{x - 1} dx$

23. Integralni hisoblang $\int_1^2 e^x dx$

24. Integralni hisoblang $\int_0^2 2^x dx$

25. Integralni hisoblang $\int_2^4 \frac{dx}{x}$

26. Integralni hisoblang $\int_1^2 \frac{dx}{2x - 1}$

27. Integralni hisoblang $\int_0^1 \frac{x^2 dx}{1+x^6}$
28. Integralni hisoblang $\int_e^{e^2} \frac{dx}{x \ln x}$
29. Integralni hisoblang $\int_{e^2}^{e^3} \frac{dx}{x \ln x}$
30. Integralni hisoblang $\int_{-\pi}^{\pi} \sin^2 x dx$
31. Integralni hisoblang $\int_{-\pi}^{\pi} \cos^2 x dx$
32. Integralni hisoblang $\int_{\pi/6}^{\pi/3} \operatorname{tg}^4 x dx$
33. Integralni hisoblang $\int_0^2 \operatorname{sh}^3 x dx$
34. Integralni hisoblang $\int_0^1 \frac{dx}{4x^2 + 4x + 5}$
35. Integralni hisoblang $\int_3^4 \frac{x^2 + 3}{x - 2} dx$
36. Integralni hisoblang $\int_{-2}^{-1} \frac{x + 1}{x^2(x - 1)} dx$
37. Integralni hisoblang $\int_2^3 \frac{dx}{x^2 - 2x - 8}$
38. Integralni hisoblang $\int_0^2 \frac{2x - 1}{2x + 1} dx$
39. Integralni hisoblang $\int_0^1 \frac{x^2 + 3x}{(x + 1)(x^2 + 1)} dx$
40. Integralni hisoblang $\int_0^1 \frac{dx}{\sqrt{x^2 + 2x + 2}}$
41. Integralni hisoblang $\int_{3/4}^2 \frac{dx}{\sqrt{2 + 3x - 2x^2}}$
42. Integralni hisoblang $\int_0^4 \frac{dx}{1 + \sqrt{x}}$
43. Integralni hisoblang $\int_0^{\pi/4} \frac{dx}{1 + 2\sin^2 x}$

44. Integralni hisoblang $\int_0^1 x e^{-x} dx$

45. Integralni hisoblang $\int_{\pi/4}^{\pi/3} \frac{x dx}{\sin^2 x}$

46. Integralni hisoblang $\int_1^3 \ln x dx$

47. Integralni hisoblang $\int_1^2 x \ln x dx$

48. Integralni hisoblang $\int_0^{1/2} \arcsin x dx$

49. Integralni hisoblang $\int_0^2 |1 - x| dx$

50. Tengsizlikni isbotlang $\frac{1}{10\sqrt{2}} < \int_0^1 \frac{x^9}{\sqrt{1+x}} dx < \frac{1}{10}$

51. Tengsizlikni isbotlang $\frac{1}{20\sqrt[3]{2}} < \int_0^1 \frac{x^{19}}{\sqrt[3]{1+x^6}} dx < \frac{1}{20}$

52. Tengsizlikni isbotlang $0 < \int_0^{200} \frac{e^{-5x} dx}{x+20} < 0,01$

53. Tengsizlikni isbotlang $1 < \int_0^1 \frac{1+x^{20}}{1+x^{40}} dx < 1 + \frac{1}{42}$

54. Tengsizlikni isbotlang $1 - \frac{1}{n} < \int_0^1 e^{-x^n} dx < 1, \quad n > 1$

55. Tengsizlikni isbotlang $0 < \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{\sin x}{x} dx < \ln 3$

56. Tengsizlikni isbotlang $\sin 1 < \int_{-1}^1 \frac{\cos x}{1+x^2} dx < 2 \sin 1$

57. Tengsizlikni isbotlang $\frac{2}{\pi} \ln \frac{\pi+2}{2} < \int_0^{\frac{\pi}{2}} \frac{\sin x}{x(x+1)} dx < \ln \frac{\pi+2}{3}$

58. Tengsizlikni isbotlang $\frac{1}{8} < \frac{\pi}{6} \int_0^2 \frac{\sin \frac{\pi}{6}(x+1)}{(x+1)(3-x)} dx < \frac{1}{6}$

59. Tengsizlikni isbotlang $0,03 < \int_0^1 \frac{x^7}{(e^x + e^{-x})\sqrt{1+x^2}} dx < 0,05$

60. Integralni hisoblang $\int_0^2 f(x)dx$, $f(x) = \begin{cases} x^2, \text{ arap } 0 \leq x \leq 1, \\ 2 - x, \text{ arap } 1 < x \leq 2. \end{cases}$

61. Integralni hisoblang $\int_0^1 f(x)dx$, $f(x) = \begin{cases} x, \text{ arap } 0 \leq x \leq t, \\ t \frac{1-x}{1-t}, \text{ arap } t < x \leq 1. \end{cases}$

62. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \dots + \frac{n-1}{n^2} \right)$$

63. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n} \right)$$

64. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{n}{n^2 + 1^2} + \frac{n}{n^2 + 2^2} + \dots + \frac{n}{n^2 + n^2} \right)$$

65. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left(\sin \frac{\pi}{n} + \sin \frac{2\pi}{n} + \dots + \sin \frac{(n-1)\pi}{n} \right)$$

66. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1^p + 2^p + \dots + n^p}{n^{p+1}} \quad (p > 0)$$

67. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left(\sqrt{1 + \frac{1}{n}} + \sqrt{1 + \frac{2}{n}} + \dots + \sqrt{1 + \frac{n}{n}} \right)$$

68. Limitni hisoblang $\lim_{x \rightarrow 0} \frac{\int_0^x \cos t^2 dt}{x}$

69. Limitni hisoblang $\lim_{x \rightarrow +\infty} \frac{\int_0^x (\arctgt)^2 dt}{\sqrt{x^2 + 1}}$

70. Limitni hisoblang $\lim_{x \rightarrow +\infty} \frac{\left(\int_0^x e^{t^2} dt \right)^2}{\int_0^x e^{2t^2} dt}$

71. Limitni hisoblang $\lim_{x \rightarrow +0} \frac{\int_0^{\sin x} \sqrt{\operatorname{tg} t} dt}{\int_0^{\operatorname{tg} x} \sqrt{\sin t} dt}$

72. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-\pi}^{\pi} \sqrt[3]{\sin x} dx$

73. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-\pi}^{\pi} e^{x^2} \sin x dx$

74. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-\pi/2}^{\pi/2} (\cos^2 x + x^2 \sin x) dx$

75. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-1}^1 \cos x \ln x dx$

76. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-1}^1 (e^x + e^{-x}) \operatorname{tg} x dx$

77. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-\pi/3}^{\pi/3} \left(x^2 \sin 5x + \cos \frac{x}{3} + \operatorname{tg}^3 x \right) dx$

78. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-\pi/3}^{\pi/3} \frac{2x^7 - x^5 + 2x^3 - x + 1}{\cos^2 x} dx$

79. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^2 e^{x^2} x dx$

80. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^1 x^2 \sqrt{1-x^2} dx$

81. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\ln 2} \sqrt{e^x - 1} dx$

82. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\ln 2} x e^{-x} dx$

83. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\pi} x \sin x dx$

84. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\pi/4} x \sin 2x dx$

85. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{2\pi} x^2 \cos x dx$

86. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^1 \arccos x dx$

87. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_1^3 \arctg \sqrt{x} dx$

88. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_1^e \frac{dx}{x \sqrt{1 + \ln x}}$

89. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^1 \frac{e^{2x} + 2e^x}{e^{2x} + 1} dx$

90. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\pi/2} \frac{dx}{2 - \sin x}$

91. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{\pi/3}^{\pi/2} \frac{dx}{3 + \cos x}$

92. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{3/4} \frac{dx}{(x+1)\sqrt{x^2+1}}$

93. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_1^9 x \cdot \sqrt[3]{1-x} dx$

94. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_{-3}^{-2} \frac{dx}{x\sqrt{x^2-1}}$

95. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^1 x^{15} \sqrt{1+3x^8} dx$

96. O'zgaruvchilarni almashtirish yoki bo'laklab integrallash usuli yordamida

hisoblang $\int_0^{\pi/2} \sin x \sin 2x \sin 3x dx$

97. Qaysisi katta bo'lishini aniqlang

$\int_0^{\pi/2} \frac{\sin x}{x} dx$ ёки $\int_0^{\pi} \frac{\sin x}{x} dx$

98. Qaysisi katta bo'lishini aniqlang

$\int_{1/2}^1 \frac{dx}{\sqrt{x}}$ ёки $\int_{1/2}^1 \frac{dx}{\sqrt[3]{x}}$

99. Qaysisi katta bo'lishini aniqlang $\int_0^1 e^{-x} \sin x dx$ ёки $\int_0^1 e^{-x^2} \sin x dx$

100. Qaysisi katta bo'lishini aniqlang $\int_1^2 \frac{dx}{\sqrt{1+x^2}}$ ёки $\int_1^2 \frac{dx}{x}$

101. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{2n} \right)$$

102. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} n \cdot \left(\frac{1}{n^2+1^2} + \frac{1}{n^2+2^2} + \dots + \frac{1}{2n^2} \right)$$

103. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \dots + \frac{n-1}{n^2} \right)$$

104. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1 + \sqrt[3]{2} + \sqrt[3]{3} + \dots + \sqrt[3]{n}}{\sqrt[3]{n^4}}$$

105. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1^3}{n^4} + \frac{2^3}{n^4} + \frac{3^3}{n^4} + \dots + \frac{(4n-1)^3}{n^4} \right)$$

106. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{3}{n} \left(1 + \sqrt{\frac{n}{n+3}} + \sqrt{\frac{n}{n+6}} + \dots + \sqrt{\frac{n}{n+3(n-1)}} \right)$$

107. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} n \left(\frac{1}{(n+1)^2} + \frac{1}{(n+2)^2} + \dots + \frac{1}{(2n)^2} \right)$$

108. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} n^2 \left(\frac{1}{(n^2+1)^2} + \frac{1}{(n^2+2)^2} + \dots + \frac{1}{(n^2+n)^2} \right)$$

109. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{1}{\sqrt{4n^2 - 1^2}} + \frac{1}{\sqrt{4n^2 - 2^2}} + \dots + \frac{1}{\sqrt{4n^2 - n^2}} \right)$$

110. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \cdot \left(\sqrt{1 + \frac{1}{n}} + \sqrt{1 + \frac{2}{n}} + \dots + \sqrt{1 + \frac{n}{n}} \right)$$

111. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left(1 + \frac{1}{\cos^2 \frac{\pi}{4n}} + \frac{1}{\cos^2 \frac{2\pi}{4n}} + \frac{1}{\cos^2 \frac{3\pi}{4n}} + \dots + \frac{1}{\cos^2 \frac{n\pi}{4n}} \right)$$

112. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \cdot \left(\sin \frac{\pi}{n} + \sin \frac{2\pi}{n} + \dots + \sin \frac{(n-1)\pi}{n} \right)$$

113. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left[\frac{1}{n} \cdot \sum_{k=1}^n f \left(a + k \cdot \frac{b-a}{n} \right) \right], f(x) \text{ функция } [a, b] \text{ da integralланувчи}$$

114. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left[\left(1 + \frac{1}{n} \right) \cdot \frac{\pi}{n^2} + \left(1 + \frac{2}{n} \right) \cdot \frac{2\pi}{n^2} + \dots + \left(1 + \frac{n}{n} \right) \cdot \frac{n\pi}{n^2} \right]$$

115. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{\pi}{n} \cdot \left(\frac{1}{2 + \cos \frac{\pi}{n}} + \frac{1}{2 + \cos \frac{2\pi}{n}} + \dots + \frac{1}{2 + \cos \frac{n\pi}{n}} \right)$$

116. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left[\left(x + \frac{1}{n} \right) + \left(x + \frac{2}{n} \right) + \dots + \left(x + \frac{n}{n} \right) \right]$$

117. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left(2^{\frac{1}{n}} + 2^{\frac{2}{n}} + \dots + 2^{\frac{n}{n}} \right)$$

118. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \left(\frac{2^{\frac{1}{n}}}{n+1} + \frac{2^{\frac{2}{n}}}{n+\frac{1}{2}} + \dots + \frac{2^{\frac{n}{n}}}{n+\frac{1}{n}} \right)$$

119. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \sin \frac{\pi}{n} \sum_{k=1}^n \frac{1}{2 + \cos \frac{k\pi}{n}}$$

120. Aniq integral yordamida limitni hisoblang

$$\lim_{n \rightarrow \infty} \frac{1^p + 2^p + \dots + n^p}{n^{p+1}} \quad (p > 0)$$

121. Integralni hisoblang $\int_0^{\pi/4} \frac{dx}{1 + 2 \sin^2 x}$

122. Integralni hisoblang $\int_0^1 x e^{-x} dx$

123. Integralni hisoblang $\int_{\pi/4}^{\pi/3} \frac{x dx}{\sin^2 x}$

124. Integralni hisoblang $\int_1^3 \ln x dx$

125. Integralni hisoblang $\int_1^2 x \ln x dx$

126. Integralni hisoblang $\int_0^{1/2} \arcsin x dx$

127. Integralni hisoblang $\int_0^{\pi} x^3 \sin x dx$

128. Integralni hisoblang $\int_0^{\pi/2} e^{2x} \cos x dx$

129. Integralni hisoblang $\int_0^e \sin \ln x dx$

130. Integralni hisoblang $\int_0^2 |1 - x| dx$

131. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} \frac{n^2}{\left(n + \frac{1}{n}\right)^{n^2}}$$

132. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=2}^{\infty} \left(\frac{n-1}{n+1}\right)^{n(n-5)}$$

133. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=2}^{\infty} \frac{1}{(\ln n)^n}$$

134. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} \left(\frac{an}{n+2}\right)^n, \quad a > 0$$

135. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} 3^{n+1} \left(\frac{n+2}{n+3}\right)^{n^2}$$

136. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=2}^{\infty} \left(\frac{n-1}{n+1}\right)^{n^2+4n+5}$$

137. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^2}$$

138. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} \frac{n! a^n}{n^n}, \quad a \neq e, \quad a > 0$$

139. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} n^{n^\alpha} - 1$$

140. Koshi yoki Dalamber alomatidan foydalanib qatorni yaqinlashuvchilikga

tekshiring
$$\sum_{n=1}^{\infty} 3^{-n} \left(\frac{n+1}{n} \right)^{n^2}$$

141. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

$$f(x) = 3x - x^3$$

142. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

$$f(x) = 8x^3 - x^4$$

143. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

$$f(x) = x^3 - 3x + 5$$

144. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

$$f(x) = x(1 + 2\sqrt{x})$$

145. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping $f(x) = e^{kx}$

146. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping $f(x) = x | x |$

147. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

$$f(x) = \frac{2x}{1+x^2}$$

148. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping $f(x) = |x|^3$

149. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping $f(x) = \frac{e^x}{x}$

150. Berilgan funktsiyaning o'suvchi, kamayivchi oraliqlarini toping

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

151. Quyidagi tengsizlikni isbotlang

$$x + \frac{1}{x} \geq 2 \quad (x > 0)$$

152. Quyidagi tengsizlikni isbotlang

$$2\sqrt{x} > 3 - \frac{1}{x} \quad (x > 1)$$

153. Quyidagi tengsizlikni isbotlang $(1+x)^\alpha \geq 1 + \alpha x \quad (x \geq -1, \alpha > 1)$

154. Quyidagi tengsizlikni isbotlang $e^x \geq 1 + x$

155. Quyidagi tengsizlikni isbotlang $\ln(1 + x) > \frac{x}{x+1} \quad (x > 0)$

156. Quyidagi tengsizlikni isbotlang $1 - 2\ln x \leq \frac{1}{x^2} \quad (x > 0)$

157. Quyidagi tengsizlikni isbotlang $(a + b)^\alpha \leq a^\alpha + b^\alpha \quad (0 \leq \alpha \leq 1)$

158. Quyidagi tengsizlikni isbotlang $\sqrt[n]{x} - \sqrt[n]{y} \leq \sqrt[n]{x-y} \quad (x \geq y \geq 0.)$

159. Quyidagi tengsizlikni isbotlang $\left(\frac{x+y}{2}\right)^n \leq \frac{x^n + y^n}{2}$

$(x \geq 0, y \geq 0, n \in \mathbb{N})$

160. Quyidagi tengsizlikni isbotlang $\frac{x-y}{x} < \ln \frac{x}{y} < \frac{x-y}{y} \quad (x > y > 0)$

161. Funktsiyaning qiymatlar sohasini toping $y = \frac{2}{\sqrt{25-x^2}}$

162. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{2x+1} - \sqrt{x+1}$

163. Funktsiyaning qiymatlar sohasini toping $y = \frac{1}{\sqrt{|x|+x}}$

164. Funktsiyaning qiymatlar sohasini toping $y = \lg(1-x^2)$

165. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{9-x^2} + \log \frac{x+1}{x-2}$

166. Funktsiyaning qiymatlar sohasini toping $y = \frac{\sqrt{x}}{\sin \pi x}$

167. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{\sin \sqrt{x}}$

168. Funktsiyaning qiymatlar sohasini toping $y = \arccos \frac{2x}{1+x^2}$

169. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{\arcsin(\log_2 x)}$

170. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{\arcsin\left(\lg \frac{x}{10}\right)}$

171. Funktsiyaning qiymatlar sohasini toping $y = \frac{x}{1+x^2}$
172. Funktsiyaning qiymatlar sohasini toping $y = \frac{x^2-5}{2x-5}$
173. Funktsiyaning qiymatlar sohasini toping $y = x + \operatorname{sign} x$
174. Funktsiyaning qiymatlar sohasini toping $y = x + \frac{1}{x} \quad \{x > 0\}$
175. Funktsiyaning qiymatlar sohasini toping $y = \sqrt{\frac{9x^2+1}{x}}$
176. Funktsiyaning qiymatlar sohasini toping $y = \lg(1-2\cos x)$
177. Funktsiyaning qiymatlar sohasini toping $y = \frac{x^2+x+2}{x^2-x+2}$
178. Funktsiyaning qiymatlar sohasini toping $y = \sin x + \cos x$
179. Funktsiyaning qiymatlar sohasini toping $y = ||x|-1|-x$
180. Funktsiyaning qiymatlar sohasini toping $y = x^2 - 4 \cdot |x-1| + 1$
181. Funktsiyaning grafigini chizing $f(x) = x^3$
182. Funktsiyaning grafigini chizing $f(x) = (x-1)^3$
183. Funktsiyaning grafigini chizing $f(x) = (x+1)^3$
184. Funktsiyaning grafigini chizing $f(x) = |x^3|$
185. Funktsiyaning grafigini chizing $f(x) = -x^2 \cdot |x|$
186. Funktsiyaning grafigini chizing $f(x) = x^3 - 3x$
187. Funktsiyaning grafigini chizing $f(x) = x^2 - x^3$
188. Funktsiyaning grafigini chizing $f(x) = -x^4 + 4x^2$
189. Funktsiyaning grafigini chizing $f(x) = 1 - x - x^3$
190. Funktsiyaning grafigini chizing $f(x) = x^4 - x^3 + x^2$
191. Funktsiyaning grafigini chizing $f(x) = \frac{1}{x^2}$

192. Funktsiyaning grafigini chizing $f(x) = \frac{1}{x^3}$

193. Funktsiyaning grafigini chizing $f(x) = x + \frac{1}{x^2}$

194. Funktsiyaning grafigini chizing $f(x) = x^2 + \frac{1}{x}$

195. Funktsiyaning grafigini chizing $f(x) = \frac{1}{(x+1)^2}$

196. Funktsiyaning grafigini chizing $f(x) = \frac{1}{(x-1)^2}$

197. Funktsiyaning grafigini chizing $f(x) = \frac{1}{1-x^2}$

198. Funktsiyaning grafigini chizing $f(x) = \frac{x^2}{1+x^2}$

199. Funktsiyaning grafigini chizing $f(x) = \frac{3x-2}{5x^2}$

200. Funktsiyaning grafigini chizing $f(x) = \frac{2x}{x^2+1}$

Kafedra mudiri:

Kurbanov B

Fan oqituvchisi:

Qutlimuratov B