

Matematika tálím baǵdarı 2-kurs (keshki) studentleri ushın “*Matematikalıq analiz*” páninen jumaqlawshı qadaǵalaw sorawları

(2024-2025 o.j. 3-semestr)

Teoriyalıq sorawlar

1. Sonli qatorlar.
2. Yaqinlashuvchi qatorlarning xossalari
3. Musbat hadli qatorlarning yaqinlashuvchilik alomatlari
4. Qatorlarning yaqinlashuvchilik alomatlari.
5. Ishorasi almashinuvchi qatorlar.
6. Erkli hadli qatorlar..
7. Funktsional ketma-ketlik va qatorlar.
8. Funktsional ketma-ketlik va qatorlar.
9. Funktsional ketma-ketlik va qatorlarning tekis yaqinlashuvchilik alomatlari
10. Funktsional ketma-ketliklar va qatorlarning funktsional xossalari.
11. Darajali qatorlar
12. Darajali qatorlarning funktsional xossalari.
13. Funktsiyalarni darajali qatorga yoyish
14. Parametrga bog'liq integrallar
15. Parametrga bog'liq integrallar

Ámeliy áhmiyetke iye sorawlar

1. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{x^n}{2^{\sqrt{n}}}$$

2. Koshi va Dalamber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:

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

3. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left[\frac{n}{3} \ln \left(1 + \frac{x}{n} \right) \right]^n$

4. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=0}^{\infty} \frac{x^n}{(n+1)5^n}$$

5. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\cos^2 x$

6. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left(\frac{x^2}{n} + x \right)^n$

7. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping. $\sum_{n=1}^{\infty} \frac{x^n}{n}$

8. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left(\frac{x^2}{n} + x \right)^n$

9. Hisoblang: $\lim_{\alpha \rightarrow 0} \int_{\alpha}^{\alpha+1} \frac{dx}{1+x^2+\alpha^2}$

10. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.
 $\sum_{n=1}^{\infty} (-2)^n \cdot x^{2n}$

11. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} n^2 \left(\frac{2x-3}{4} \right)^n$

12. Funkcional ketma-ketlikning limit funkciyasin toping. $f_n(x) = n[\ln(x+n) - \ln n]$

13. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.
 $\sum_{n=1}^{\infty} \frac{3^n + (-2)^n}{n} (x+1)^n$

14. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} (5-x^2)^n$

15. Koshi va Dalamber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:
 $\sum_{n=2}^{\infty} \left(\frac{n-1}{n+1} \right)^{n(n-1)}$

16. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.
 $\sum_{n=1}^{\infty} \left(\frac{x-1}{3} \right)^n \cdot \frac{1}{\sqrt[3]{n}}$

17. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{\ln^n x}{n^2}$

18. Hisoblang: $\lim_{\alpha \rightarrow 0} \int_0^2 x^2 \cos \alpha x dx$

19. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.
 $\sum_{n=1}^{\infty} \frac{1}{2^n + 3^n} x^n$

20. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{1}{(x+2)^n}$

21. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\sin^2 x$

22. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{2n+4}{5n+7} \right)^n x^n$$

23. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} (5-x^2)^n$

24. Funkcional ketma-ketlikning limit funkciyasini toping. $f_n(x) = n[\ln(x+n) - \ln n]$

25. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{x-1}{3} \right)^n \cdot \frac{1}{\sqrt[3]{n}}$$

26. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{\ln^n x}{n^2}$

27. Koshi va Dalamber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:

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

28. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} \left(\frac{x-1}{2x+1} \right)^n$

29. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} 2^{\ln n} \cdot x^n$$

30. Hisoblang: $\lim_{\alpha \rightarrow 0} \int_{-1}^1 \sqrt{x^2 + \alpha^2} dx$

31. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{1}{2^n + 3^n} x^n$$

32. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{1}{(x+2)^n}$

33. Koshi va Dalamber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:

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

34. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{x-1}{3} \right)^n \cdot \frac{1}{\sqrt[3]{n}}$$

35. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\ln(12-x-x^2)$

36. Hisoblang: $\int_0^{\frac{\pi}{2}} \ln(a^2 \sin^2 x + b^2 \cos^2 x) dx$

37. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} (5-x^2)^n$

38. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\frac{3x-5}{x^2-4x+3}$

39. Hisoblang: $\int_0^{\pi} \ln(1-2a \cos x + a^2) dx$

40. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=0}^{\infty} 2^n \sin \frac{x}{3^n}$

41. Koshi va Dalmber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:

$$\sum_{n=1}^{\infty} \left(\cos \frac{a}{n} \right)^{n^3}, a > 0$$

42. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\frac{3x-5}{x^2-4x+3}$

43. Funkcional qatorni teng olchamli yaqinlashishga tekshiring.

$$\sum_{n=1}^{\infty} \frac{1}{(x+2n-1)(x+2n+1)}, X = [0, +\infty)$$

44. Hisoblang: $\lim_{\alpha \rightarrow 0} \int_{\alpha}^{\alpha+1} \frac{dx}{1+x^2+\alpha^2}$

45. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{2n+4}{5n+7} \right)^n x^n$$

46. Funkcional ketma-ketlikning limit funkciyasini toping.

$$f_n(x) = \left(\frac{n+x}{n-x} \right)^n, -\infty < x < +\infty$$

47. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\ln \sqrt{\frac{1+x}{1-x}}$

48. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{1}{2^n + 3^n} x^n$$

49. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{1}{2^n + 3^n} x^n$$

50. Koshi va Dalamber alomatlaridan foydalanib yaqinlashuvchilikka tekshiring:

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

51. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\cos \frac{x^2}{3}$

52. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\frac{3x-5}{x^2-4x+3}$

53. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

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

53. Funkcional ketma-ketlikning limit funkciyasini toping.

$$f_n(x) = \left(\frac{n+x}{n-x} \right)^n, \quad -\infty < x < +\infty$$

54. Qatorni yaqinlashuvchilikka tekshiring va yig'indisini toping: $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$

55. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{(x-2)^n}$

56. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $\ln \sqrt{\frac{1+x}{1-x}}$

57. Qatorni yaqinlashuvchilikka tekshiring va yig'indisini toping: $\sum_{n=1}^{\infty} \frac{1}{n(n+1)(n+2)}$

58. Hisoblang: $\int_0^{\frac{\pi}{2}} \ln(a^2 \sin^2 x + b^2 \cos^2 x) dx$

59. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{x-1}{3} \right)^n \cdot \frac{1}{\sqrt[3]{n}}$$

6. Qatorni yaqinlashuvchilikka tekshiring va yig'indisini toping: $\sum_{n=1}^{\infty} \frac{1}{n(n+2)(n+3)}$

61. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

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

62. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left[\frac{n}{3} \ln \left(1 + \frac{x}{n} \right) \right]^n$

63. Funkcional ketma-ketlikning limit funkciyasin toping.

$$f_n(x) = nx^2 \sin \frac{x}{n}, \quad -\infty < x < +\infty$$

64. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: e^{-x^2}

65. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left(\frac{x^2}{n} + x \right)^n$

66. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{x^n}{n}$$

67. Qatorni yaqinlashuvchilikka tekshiring va yig'indisin toping: $\sum_{n=1}^{\infty} \sin \frac{\alpha}{2^{n+1}} \sin \frac{3\alpha}{2^{n+1}}$

68. Hisoblang: $\lim_{\alpha \rightarrow 0} \int_{\alpha}^{\alpha+1} \frac{dx}{1+x^2+\alpha^2}$

69. Hisoblang: $\int_0^{\frac{\pi}{2}} \ln(a^2 \sin^2 x + b^2 \cos^2 x) dx$

70. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} n^2 \left(\frac{2x-3}{4} \right)^n$

71. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

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

72. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

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

73. Qatorning yig'indisin toping. $\sum_{n=1}^{\infty} nx^n$

74. Qatorni yaqinlashuvchilikka tekshiring va yig'indisin toping: $\sum_{n=1}^{\infty} \sin \frac{1}{2^n} \cos \frac{3}{2^n}$

75. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \frac{x^n}{2^{\sqrt{n}}}$$

76. Qatorning yig'indisin toping. $\sum_{n=0}^{\infty} \frac{(-1)^n x^{n+1}}{n+1}$

77. Funktsiyani x ning darajalari bo'yicha darajali qatorga yoying: $e^{2x} + 2e^{-x}$

78. Qatorning yig'indisin toping. $\sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{2n+1}$

79. Funkcional qatorning absolyut yaqinlashish sohasin toping. $\sum_{n=1}^{\infty} \left[\frac{n}{3} \ln \left(1 + \frac{x}{n} \right) \right]^n$

80. Qatorni yaqinlashuvchilikka tekshiring va yig'indisin toping: $\sum_{n=1}^{\infty} \arctg \frac{1}{2n^2}$

81. Qatorni yaqinlashishga tekshiring. $\sum_{n=1}^{\infty} \frac{n! a^n}{n^n}$, $a \neq e, a > 0$

82. Funkcional qatorning yaqinlashish sohasini toping. $\sum_{n=1}^{\infty} (5 - x^2)^n$

83. Funkcional ketma-ketlikning limit funkciyasin toping. $f_n(x) = n[\ln(x+n) - \ln n]$

84. Darajali qatorning yaqinlashish radiusin va yaqinlashish intervalini toping.

$$\sum_{n=1}^{\infty} \left(\frac{x-1}{3} \right)^n \cdot \frac{1}{\sqrt[3]{n}}$$

85. Qatorning yig'indisin toping. $\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}$

86. Qatorni yaqinlashuvchilikka tekshiring va yig'indisin toping: $\sum_{n=1}^{\infty} \arctg \frac{1}{2n^2}$