

4- o'zb.MI "Matematik analizning qo'shimcha boblari" fanidan savollar

1. Limit funksiya. Tekis yaqinlashish.
2. Limit funksiyaning uzluksizligi.
3. Parametrga bog'liq integrallar. Integral belgisi ostida limitga o'tish.
4. Parametrga bog'liq integralda integral belgisi ostida limitga o'tish.
5. Parametrga bog'liq integralning parametr bo'yicha uzluksizligi. .
6. Parametrga bog'liq integralni parametr bo'yicha differensiallash.
7. Parametrga bog'liq integralni parametr bo'yicha integrallash.
8. Parametrga bog'liq integrallar (umumiy hol).
9. Parametrga bog'liq xosmas integrallar.
10. Parametrga bog'liq xosmas integralning tekis yaqinlashishi
11. Parametrga bog'liq xosmas integrallarda integral belgisi ostida limitga o'tish.
12. Parametrga bog'liq xosmas integrallarning parametr bo'yicha uzluksizligi.
13. Parametrga bog'liq xosmas integrallarni parametr bo'yicha differensiallash.
14. Parametrga bog'liq xosmas integrallarni parametr bo'yicha integrallash.
15. Beta funksiya va uning xossalari
16. Gamma funksiya va uning xossalari
17. Beta va gamma funksiyalar orasidagi bog'lanish
18. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, n) = \frac{n \cdot x}{1 + n^3 x^2}; D = \{(x, n) \in R^2 : 1 \leq x < +\infty, n \in N\}, n_0 = \infty.$$

19. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, n) = \frac{n^2 x^2}{1 + n^2 x^4} \cdot \sin \frac{x^2}{\sqrt{n}}; D = \{(x, n) \in R^2 : 1 \leq x < +\infty, n \in N\}, n_0 = \infty.$$

20. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, n) = \sin(n e^{-nx}); D = \{(x, n) \in R^2 : 1 \leq x < +\infty, n \in N\}, n_0 = \infty.$$

21. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, n) = \frac{\ln nx}{nx^2}; D = \{(x, n) \in R^2 : 1 \leq x < +\infty, n \in N\}, n_0 = \infty.$$

22. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, n) = n^{3/2} \left(1 - \cos \frac{\sqrt[4]{x}}{n} \right); D = \{(x, n) \in R^2 : 0 \leq x < +\infty, n \in N\}, n_0 = \infty.$$

23. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, y) = \frac{1}{x^3} \cdot \cos \frac{x}{y}; D = \{(x, y) \in R^2 : 0 < x < 1, 0 < y < +\infty\}, y_0 = \infty.$$

24. Limit funktsiyani tekis yaqinlashishga tekshiring:

$$f(x, y) = \sqrt{x^2 + \frac{1}{\sqrt{y}}}; D = \{(x, y) \in R^2 : x \in R, 0 < y < +\infty\}, y_0 = +\infty.$$

$$25. F(\alpha) = \int_{\sin \alpha}^{\cos \alpha} e^{\alpha \sqrt{1-x^2}} dx \text{ bo'lsa } F'(\alpha) \text{ ni toping.}$$

$$26. F(x) = \int_0^x f(t)(x-t)^{n-1} dt \text{ bo'lsa } F^{(n)}(x) \text{ ni toping.}$$

$$27. F(\alpha) = \int_{a+\alpha}^{b+\alpha} \frac{\sin \alpha x}{x} dx \text{ bo'lsa } F'(\alpha) \text{ ni toping}$$

28. $F(\alpha) = \int_0^{\alpha} \frac{\ln(1+\alpha x)}{x} dx$ bo`lsa $F'(\alpha)$ ni toping

29. $F(\alpha) = \int_0^{\alpha} f(x+\alpha, x-\alpha) dx$ bo`lsa $F'(\alpha)$ ni toping

30. $F(\alpha) = \int_0^{\alpha^2} dx \int_{x-\alpha}^{x+\alpha} \sin(x^2 + y^2 - \alpha^2) dy$ bo`lsa $F'(\alpha)$ ni toping.

31. $F(\alpha) = \int_0^1 \sin \alpha x dx$ bo`lsa $F'(\alpha)$ ni toping

32. $F(x, y) = \int_{\frac{x}{y}}^{xy} (x-yz)f(z) dz$ bo`lsa $F''_{xy}(x, y)$ ni toping

33. $F(\alpha) = \int_1^3 \frac{\cos(\alpha x^3)}{x} dx$ bo`lsa $F'(\alpha)$ ni toping.

34. $F(\alpha) = \int_1^2 \frac{e^{\alpha x^2}}{x} dx$ bo`lsa $F'(\alpha)$ ni toping

35. $F(\alpha) = \int_{\alpha e^{-\alpha}}^{\alpha e^{\alpha}} \ln(1+(\alpha x)^2) dx$ bo`lsa $F'(\alpha)$ ni toping.

36. $F(\alpha) = \int \frac{4\alpha \arctg \alpha x}{2\alpha x} dx$ bo`lsa $F'(\alpha)$ ni toping

37. Eyer integralı orqali ifodalang va aniqlanish sohasini toping. $\int_0^{\pi} \frac{\sin^{n-1} x}{(1+k \cos x)^n} dx, \quad 0 < k < 1.$

38. Eyer integrali orqali ifodalang va aniqlanish sohasini toping. $\int_0^{+\infty} \frac{\ln^2 x}{1+x^4} dx.$

39. Eyer integrali orqali ifodalang va aniqlanish sohasini toping. $\int_0^{+\infty} \frac{x^{p-1} - x^{q-1}}{(1+x) \ln x} dx.$

40. Eyer integrali orqali ifodalang va aniqlanish sohasini toping. $\int_0^{+\infty} x^p e^{-ax} \ln x dx, \quad a > 0$

41. $E(k) = \int_0^{\frac{\pi}{2}} \sqrt{1-k^2 \sin^2 \varphi} d\varphi, \quad F(k) = \int_0^{\frac{\pi}{2}} \frac{1}{\sqrt{1-k^2 \sin^2 \varphi}} d\varphi \quad (0 < k < 1),$

hosilalarni toping, ularni $E(k), F(k)$ lar orqali ifodalang.

42. $F(y) = \int_0^1 \ln \sqrt{x^2 + y^2} dx$ funktsiya berilgan. $y = 0$ da Leybnits qoidasi bo`yicha hosilani hisoblash mumkin mi

43. $F(\alpha) = \int_0^{+\infty} \frac{e^{-x} dx}{|\sin x|^{\alpha}}, \quad (0 < \alpha < 1)$ funktsiyani berilgan oraliqda uzluksizlikga tekshiring.

44. $\int_1^{+\infty} \ln \left(1 + \frac{y}{x^2 + y^3} \right) dx$ tekis yaqinlashishga tekshiring.
45. $\int_0^1 \frac{\cos \frac{1}{1-x}}{\sqrt[n]{1-x^2}} dx$ integralning yaqinlashish sohasini aniqlang.
46. $\int_0^{+\infty} \frac{\sin x}{x^p + \sin x} dx$, $p > 0$. integralning yaqinlashish sohasini aniqlang.
47. $\int_0^2 \frac{x^\alpha}{\sqrt[3]{(x-1)(x-2)^2}} dx$, $\left(\left| \alpha \right| < \frac{1}{2} \right)$ tekis yaqinlashishga tekshiring.
48. $\int_0^{+\infty} \frac{e^{-\alpha x}}{1+x^2} dx$. integralning yaqinlashish sohasini aniqlang.
49. $\int_\pi^{+\infty} \frac{x \cos x}{x^p + x^q} dx$. integralning yaqinlashish sohasini aniqlang.
50. $\int_0^{+\infty} \frac{\sin x^q}{x^p} dx$. integralning yaqinlashish sohasini aniqlang.
51. $\int_0^2 \frac{dx}{|\ln x|^p}$. integralning yaqinlashish sohasini aniqlang.
52. $\int_0^1 \frac{\cos \frac{1}{1-x}}{\sqrt[n]{1-x^2}} dx$. integralning yaqinlashish sohasini aniqlang.
53. $\int_1^{+\infty} \frac{dx}{x^\alpha}$, $1 < \alpha_0 \leq \alpha < +\infty$. tekis yaqinlashishga tekshiring.
54. : $\int_1^{+\infty} \frac{dx}{x^\alpha}$, $1 < \alpha < +\infty$. tekis yaqinlashishga tekshiring
55. : $\int_0^1 \frac{dx}{x^\alpha}$, $0 < \alpha < 1$. tekis yaqinlashishga tekshiring
56. : $\int_1^\infty \frac{dx}{x^\alpha + 1}$ $0 < \alpha < +\infty$ tekis yaqinlashishga tekshiring
57. $\int_{-\infty}^{+\infty} \frac{\cos \alpha x}{1+x^2} dx$, $(-\infty < \alpha < +\infty)$. tekis yaqinlashishga tekshiring