**Kattaqo‘rg‘on davlat pedagogika instituti Aniq va tabiiy fakulteti**
**2-bosqich Matematika yo‘nalishi talabalariga 3-semestr uchun**
**« Matematik analiz » fanidan yakuniy nazorat savollari**
**Imtihon shakli: yozma-og‘zaki**

**TASDIQLAYMAN**
**O‘quv-uslubiy boshqarma boshlig‘i**
**_____ I.Madatov**
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| № | **1-QISM** “NAZARIY SAVOLLAR 1” deb nomalanadi va semestrda o‘qitilishi rejalashtirilgan mavzularning kirish va 1-reja qismidan asosan nazariy savollardan iborat bo’ladi (tayanch iborasi bo’ladi). | **2-QISM** “NAZARIY SAVOLLAR 2” deb nomalanadi va semestrda o‘qitilishi rejalashtirilgan mavzularning 2-rejasidan asosan mulohazaviy savollardan iborat bo’ladi (tayanch iborasi bo’ladi). | **3-QISM** “AMALIY SAVOLLAR 1” deb nomalanadi va semestrda o‘qitilishi rejalashtirilgan mavzularning asosan misol, masala kabi savollardan iborat bo’ladi (tayanch iborasi bo’lmaydi). | **4-QISM** “AMALIY SAVOLLAR 2” deb nomalanadi va semestrda o‘qitilishi rejalashtirilgan mavzularning misol hamda masala kabi savollardan iborat bo’ladi (tayanch iborasi bo’lmaydi). | **5-qism** “AMALIY SAVOLLAR 3” deb nomalanadi va semestrda o‘qitilishi rejalashtirilgan mavzularning misol masala savollardan iborat bo’ladi (tayanch iborasi bo’lmaydi). |
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| 1 | Sonli qator deb nimaga aytiladi? | Sonli qatorlarning yaqinlashuvchili deganda nimani tushunasiz? | $\sum_{n=1}^{\infty}\frac{1}{2^n}$ sonli qatorning yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. | $\sum_{n=1}^{\infty}\frac{1}{3^n}$ sonli qatorning yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. | $\sum_{n=1}^{\infty}\frac{1}{4^n}$ sonli qatorning yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. |
| | Yaqinlashuvchi sonli qatorlarning | Sonli qatorlar yaqinlashuvchilin | $\sum_{n=1}^{\infty}\frac{1}{n(n+1)}$ sonli qatorning | $\sum_{n=1}^{\infty}\frac{1}{n(n+2)}$ sonli qatorning | $\sum_{n=1}^{\infty}\frac{1}{(n+1)(n+2)}$ sonli qatorning |

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| | qanday xossalarini bilasiz? | ing zaruruiy va yetarli shartlari qanday? | yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. | yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. | yaqinlashuvchiligini aniqlang va uning yig‘indisini toping. |
| 2 | Musbat hadli qator deb nimaga aytiladi? | Musbat hadli qatorlar uchun yaqinlashishning zaruriy va yetarli shartlari qanday? | $\sum_{n=1}^{\infty}\frac{1}{n^2}$ musbat hadli qatorni yaqinlashishga tekshiring | $\sum_{n=1}^{\infty}\frac{3^n}{n!}$ musbat hadli qatorni yaqinlashishga tekshiring | $\sum_{n=1}^{\infty}\frac{2^n}{n!}$ musbat hadli qatorni yaqinlashishga tekshiring |
| | Musbat hadli qatorlar uchun Dalamber alomatini ayting? | Musbat hadli qatorlar uchun Koshi alomatini ayting? | $\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n$ musbat hadli qatorni yaqinlashishga tekshiring | $\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n$ musbat hadli qatorni yaqinlashishga tekshiring | $\sum_{n=1}^{\infty}\frac{n!}{2^n}$ musbat hadli qatorni yaqinlashishga tekshiring |
| 3 | Absolyut yaqinlashuvchi qator deb nimaga aytiladi? | Shartli yaqinlashuvchi qator deb nimaga aytiladi | $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{2^n}$ qatorn absolyut va shartli yaqinlashishgatekshiring | $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{n^2}$ qatorn absolyut va shartli yaqinlashishgatekshiring | $\sum_{n=1}^{\infty}\frac{(-1)^{n}}{n^2}$ qatorn absolyut va shartli yaqinlashishgatekshiring |
| | Absolyut yaqinlashuvchi qatorga misol keltiring? | Shartli yaqinlashuvchi qatorga misol keltiring? | $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{\sqrt{n}}$ qatorn absolyut va shartli yaqinlashishgatekshiring | $\sum_{n=1}^{\infty}\frac{(-1)^{n}}{n^3}$ qatorn absolyut va shartli yaqinlashishgatekshiring | $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}}{n}$ qatorn absolyut va shartli yaqinlashishgatekshiring |
| 4 | Ixtiyoriy hadli qatorlar uchun Dirixle alomati qanday | Ixtiyoriy hadli qatorlar uchun Lebnits alomati qanday | $1-\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{3}}-\frac{1}{\sqrt{4}}+\cdots$ qatorni | $\sum_{n=1}^{\infty}\frac{\sin n}{\sqrt[3]{n}}$ qatorni yaqinlashishga tekshiring | Ushbu $\sum_{n=1}^{\infty}\frac{\cos n}{n}$ qatorni yaqinlashishga tekshiring |

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| | | | yaqinlashishga tekshiring | | |
| | Ixtiyoriy hadli qatorlar uchun Abel alomati qanday | Dalamber alomati yordamida qatorning yaqinlashishini qanday tekshirish mumkin | Ushbu $\sum_{n=1}^{\infty}\frac{(-1)^n}{n}$ qatorni yaqinlashishga tekshiring | Ushbu $\sum_{n=1}^{\infty}\frac{(-1)^n}{n^2}$ qatorni yaqinlashishga tekshiring | Ushbu $\sum_{n=1}^{\infty}\frac{2^n}{n!}$ qatorni yaqinlashishga tekshiring |
| 5 | $R^n$ fazo deb nimaga aytiladi | $R^n$ fazoda ochiq to‘plam deb qanday to‘plamga aytiladi | Quyidagi tengsizlik bilan berilgan nuqtalar to'plamining geometrik o'rnini aniqlang: $y \le 2x+4$ | Quyidagi tengsizlik bilan berilgan nuqtalar to'plamining geometrik o'rnini aniqlang: $(x-4)^2+(y+6)^2 \le 25$ | Quyidagi tengsizlik bilan berilgan nuqtalar to'plamining geometrik o'rnini aniqlang: $x^2+6x+y^2-2y-26>0$ |
| | $R^n$ fazoda yopiq to‘plam deb qanday to‘plamga aytiladi | $R^n$ fazoda metrika tushunchasi | Quyidagi tengsizlik bilan berilgan nuqtalar to'plamining geometrik o'rnini aniqlang: $y^2 \ge 6x$ | Fazoda tengsizliklar sistemasi yordamida berilgan nuqtalar to‘plamining geometrik o‘rnini aniqlang: $\begin{cases} x>0 \\ y>0 \\ z>0 \end{cases}$ | Fazoda tengsizlik yordamida berilgan nuqtalar to‘plamining geometrik o‘rnini aniqlang: $xyz>0$ |

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| 6 | $R^n$ fazoda ketma-ketlik tushunchasi. | $R^n$ fazoda ketma-ketlikning limiti deb nimaga aytiladi | $R^n$ fazoda ushbu $\{x^{(n)}\} = \left\{\frac{1}{n}, \frac{1}{n}, \dots, \frac{1}{n}\right\}$ ketma-ketlikning limiti $a = (0,0, \dots, 0)$ ekanligini ko'rsating. | $R^2$ fazoda ushbu $\{x^{(n)}\} = \left\{\frac{1}{n}, \frac{10}{n}\right\}$ ketma-ketlikning limiti $a = (0,0)$ ekanligini ko'rsating. | $R^2$ fazoda ushbu $\{x^{(n)}\} = \left\{\frac{3}{n}, \frac{1}{n^2}\right\}$ ketma-ketlikning limiti $a = (0,0)$ ekanligini ko'rsating. |
| | $R^n$ fazoda ketma-ketliklarming xossalari. | $R^n$ fazoda karrali va takroriy limitlar haqida tushuncha | $R^2$ fazoda ushbu $\{x^{(n)}\} = \left\{\frac{3n}{2n-1}, \frac{2-n}{2+n}\right\}$ ketma-ketlikning limiti $a = \left(\frac{3}{2}, -1\right)$ ekanligini ko'rsating. | $R^2$ fazoda ushbu $\{x^{(n)}\} = \left\{n\left(\sqrt[n]{5} - 1\right), \left(\frac{n+2}{n}\right)^n\right\}$ ketma-ketlikning limiti $a = (ln5, e^2)$ ekanligini ko'rsating. | $R^2$ fazoda ushbu $\{x^{(n)}\} = \left\{\frac{1}{n}, \frac{sinn}{n}\right\}$ ketma-ketlikning limiti $a = (0,0)$ ekanligini ko'rsating. |
| 7 | Ko'p o'zgaruvchili funksiya tushunchasi va unga oid misollar | Ko'p o'zgaruvchili funksiyaning aniqlanish sohasi deb nimaga aytiladi? | Funksiyaning aniqlanish sohasini toping: $u = \sqrt{1 - x^2} + \sqrt{y^2 - 1};$ | Quyidagi $\lim\limits_{x \to +\infty} \left(\lim\limits_{y \to \infty} \sin \frac{\pi x}{2x+y}\right)$ ikki karrali limitni hisoblang. | Funksiyaning aniqlanish sohasini toping: $u = \sqrt{9 - x^2 - y^2}$ |
| | Ko'p o'zgaruvchili funksiya limiti ta'riflari (Geyne, Koshi ta'riflari) | Ko'p o'zgaruvchili funksiyaning limiti deb nimaga aytiladi | Quyidagi $\lim\limits_{x \to 1} \left(\lim\limits_{y \to 0} \log_x (x + y)\right)$ ikki karrali limitni hisoblang. | Quyidagi $\lim\limits_{x \to 0} \left(\lim\limits_{y \to a} \frac{\sin xy}{x}\right)$ ikki karrali limitni hisoblang. | Quyidagi $\lim\limits_{x \to 1} \left(\lim\limits_{y \to 0} \frac{ln(x+e^y)}{\sqrt{x^2+y^2}}\right)$ ikki karrali limitni hisoblang. |
| 8 | Ko'p o'zgaruvchili funksiyaning | Ko'p o'zgaruvchili funksiyaning | Ushbu $f(x,y) = \frac{2x+3}{x^2+y^2+1}$ funksiyaning | Ushbu $f(x,y) = \frac{x+2}{x^2+y^2+3}$ funksiyaning | Ushbu $f(x,y) = \frac{y+3}{x^2+y^2+4}$ |

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| | uzluksizligi deb nimaga aytiladi | tekis uzluksizligi deb nimaga aytiladi | ixtiyoriy $(x_0, y_0) \in R^2$ nuqtada uzluksiz bo'lishini ko'rsating. | ixtiyoriy $(x_0, y_0) \in R^2$ nuqtada uzluksiz bo'lishini ko'rsating. | funksiyaning ixtiyoriy $(x_0, y_0) \in R^2$ nuqtada uzluksiz bo'lishini ko'rsating. |
| | Ko'p o'zgaruvchili funksiyaning biror nuqtada uzluksizlik ta'rifini ayting | Ko'p o'zgaruvchili funksiya uchun uzliksizlik va tekis uzluksizlik deganda nimani tushunasiz | Ushbu $f(x,y) = \begin{cases} x^2+y^2, agar\ (x,y) = \\ 1, agar\ (x,y) = ( \end{cases}$ funksiyaning $(0,0)$ nuqtada uzilishga ega bo'lishini ko'rsating. | Ushbu $f(x,y) = x + y$ funksiyaning ixtiyoriy $(x_0, y_0) \in R^2$ nuqtada uzluksiz bo'lishini ko'rsating. | Ushbu $f(x,y) = x - y$ funksiyaning ixtiyoriy $(x_0, y_0) \in R^2$ nuqtada uzluksiz bo'lishini ko'rsating. |
| 9 | Ko'p o'zgaruvchili funksiyaning xususiy hosilasi deb nimaga aytiladi | Ikki o'zgaruvchili funksiyaning xususiy hosilasi deganda nimani tushunasiz? | Ushbu $f(x,y) = x^3 + y^2$ ikki o'zgaruvchili funksiyaning xususiy hosilalarini hisoblang. | Ushbu $f(x,y) = e^{x^2 y}$ ikki o'zgaruvchili funksiyaning xususiy hosilalarini hisoblang. | Ushbu $f(x,y) = 2x^3 - y$ ikki o'zgaruvchili funksiyaning xususiy hosilalarini hisoblang. |
| | Uch o'zgaruvchili funksiyaning differensiallanuvchanligi deb nimaga aytiladi | Ikki o'zgaruvchili funksiyaning differensiallanuvchanligi deb nimaga aytiladi | Ushbu $f(x,y) = \sin(x+y)$ ikki o'zgaruvchili funksiyaning xususiy hosilalarini hisoblang. | Ushbu $f(x,y) = \cos(x^2+y^2)$ ikki o'zgaruvchili funksiyaning xususiy hosilalarini hisoblang. | Ushbu $f(x,y) = x^3 + y^2$ ikki o'zgaruvchili funksiyaning to'liq differensialini toping. |
| 10 | Ko'p o'zgaruvchili funksiyaning | Ko'p o'zgaruvchili funksiyaning | Ushbu $f(x,y) = \sin(x^2+y^2)$ ikki o'zgaruvchili | Ushbu $f(x,y) = e^{x^3 y}$ ikki o'zgaruvchili | Ushbu $f(x,y) = 2x^3 - 3y^2$ ikki o'zgaruvchili |

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| | differensiali tushunchasi | to’liq differensiali tushunchasi | funksiyaning to’liq differensialini toping. | funksiyaning to’liq differensialini toping. | funksiyaning to’liq differensialini toping. |
| | Ko'p o'zgaruvchili funksiyaning differensialining xossalari | Ko'p o'zgaruvchili funksiyaning differensialining geometrik ma’nosi | Ushbu $f(x,y)=\sin(x^2+y^2)$ ikki o‘zgaruvchili funksiyaning M(x;y) nuqtadagi gradientini toping. | Ushbu $f(x,y)=\cos(x^2y^3)$ ikki o‘zgaruvchili funksiyaning M(x;y) nuqtadagi gradientini toping. | Ushbu $f(x,y)=2x^3-3y^2$ ikki o‘zgaruvchili funksiyaning to’liq differensialini toping. |
| 11 | Ko‘p o‘zgaruvchili funksiyaning birinchi tartibli xususiy hosilasi deb nimaga aytiladi | Ko‘p o‘zgaruvchili funksiyaning ikkinchi tartibli to’liq differensiali deb nimaga aytiladi | Ushbu $f(x,y)=ln(x^2+y^2)$ funksiyaning barcha ikkinchi tartibli xususiy hosilalarini toping. | Ushbu $f(x,y)=x^2+y^2$ funksiyaning barcha ikkinchi tartibli xususiy hosilalarini toping. | Ushbu $f(x,y)=x^3+y^2$ funksiyaning barcha ikkinchi tartibli xususiy hosilalarini toping. |
| | Ko‘p o‘zgaruvchili funksiyaning ikkinchi tartibli xususiy hosilasi deb nimaga aytiladi | Ko’p o’zgaruvchili funksiya uchun Teylor formulasi | Ushbu $f(x,y)=x^2-3xy+y^2-4x+5y,\ \ A(1;1)$ funksiyani Teylor formulasi bo’yicha yoying. | Ushbu $f(x,y)=x^3+3xy-2y^3,\ \ A(1;2)$ funksiyani Teylor formulasi bo’yicha yoying. | Ushbu $f(x,y)=\sin(2x+3y)$ funksiyaning barcha ikkinchi tartibli xususiy hosilalarini toping. |
| 12 | Ikki o‘zgaruvchili funksiyaning | Ikki o‘zgaruvchili funksiyaning lokal maksimumi | Ushbu $f(x,y)=x^2+xy+y^2-$ | Ushbu $f(x,y)=2xy-2x-4y$ | Ushbu $f(x,y)=x^2+(y-1)^2$ |

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| | ekstremumi deb nimaga aytiladi | va lokal minimumi qanday aniqlanadi | $6x-9y$ funksiyani ekstrimumga tekshiring | funksiyani ekstrimumga tekshiring | funksiyani ekstrimumga tekshiring |
| | Ikki o‘zgaruvchili funksiyaning ekstremumini aniqlashda ikkinchi tartibli xususiy hosilalardan qanday foydalaniladi | Ikki o‘zgaruvchili funksiyaning kritik nuqtalari qanday topiladi | Ushbu $f(x,y)=x^3+y^3-3xy$ funksiyani ekstrimumga tekshiring | Ushbu $f(x,y)=xy(1-x-y)$ funksiyani ekstrimumga tekshiring | Ushbu $f(x,y)=xy+\frac{50}{x}+\frac{20}{y}$ funksiyani ekstrimumga tekshiring |
| 13 | Funksional ketma-ketlik deb nimaga aytiladi | Funksional ketma-ketlikning tekis yaqinlashuvchanligi haqidagi Koshi kriteriyasini ayting | $f_n(x)=\frac{2nx^2}{1+n+x},0\le x\le 1$funksional ketma-ketlikning limit funksiyasi $f(x)$ ni toping | $f_n(x)=\frac{arctgnx}{1+nx+x^2},0<x<+\infty$ funksional ketma-ketlikning limit funksiyasi $f(x)$ ni toping | $f_n(x)=\frac{n+1}{n+x^2},-\infty<x<+\infty$ funksional ketma-ketlikning limit funksiyasi $f(x)$ ni toping |
| | Funksional ketma-ketlikning nuqtada yaqinlashuvchanligi deganda nimani tushunasiz | Funksional ketma-ketlikning to’plamda yaqinlashuvchanligi deganda nimani tushunasiz | $f_n(x)=n\sin\frac{1}{nx},0<x<+\infty$ funksional ketma-ketlikning limit funksiyasi $f(x)$ ni toping | $f_n(x)=\frac{n^2x}{1+n^2x},0\le x\le 2$ funksional ketma-ketlikning limit funksiyasi $f(x)$ ni toping | $f_n(x)=\frac{n^2}{x^2+n^2},-1\le x\le 1$ funksional ketma-ketlikning limit |

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| | | | | | funksiyasi $f(x)$ ni toping |
| 14 | Funksional qator deb nimaga aytiladi | Funksional qatorning nuqtada yaqinlashuvchanligi deganda nimani tushunasiz | $\sum_{n=1}^{\infty} \frac{\cos nx}{n\sqrt[3]{n}}, x \in (-\infty, +\infty)$ funksional qatorni Veyershtrass alomatidan foydalanib tekis yaqinlashuvchi ekanligini ko'rsating. | $\sum_{n=1}^{\infty} \frac{\sin nx}{n^2}, x \in (-\infty, +\infty)$ funksional qatorni Veyershtrass alomatidan foydalanib tekis yaqinlashuvchi ekanligini ko'rsating. | $\sum_{n=1}^{\infty} \frac{\cos nx}{n\sqrt[3]{n}}, x \in (-\infty, +\infty)$ funksional qatorni Veyershtrass alomatidan foydalanib tekis yaqinlashuvchi ekanligini ko'rsating. |
| | Funksional qatorning tekis yaqinlashuvchanligi haqidagi Veyershtrass alomati qanday | Funksional qatorning tekis yaqinlashuvchanligi deb nimaga aytiladi | Quyidagi funksional qatorlarning ko'rsatilgan oraliqlarda tekis yaqinlashuvchiligini, Veyershtrass alomatidan foydalanib, isbotlang: $\sum_{n-1}^{\infty} \frac{x^4}{2+\sqrt[3]{n^4 x^4}}, \ X = (-\infty; +\infty)$. | Quyidagi funksional qatorlarning ko'rsatilgan oraliqlarda tekis yaqinlashuvchiligini, Veyershtrass alomatidan foydalanib, isbotlang: $\sum_{n=1}^{\infty} \frac{\cos 3nx}{\sqrt{n^3 + x^3}}, \ X = [0; \infty)$. | Quyidagi funksional qatorlarning ko'rsatilgan oraliqlarda tekis yaqinlashuvchiligini, Veyershtrass alomatidan foydalanib, isbotlang: $\sum_{n-1}^{\infty} \frac{1}{(n+x)^4}, \ X = [0; \infty)$. |

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| 15 | Funksional qator yig’indisining uzluksizligi | Funksional qatorlarning tekis yaqinlashuvchanligining Veyershtrass alomati | Quyidagi funksional qatorlarning ko’rsatilgan oraliqlarda tekis yaqinlashuvchiligini, Veyershtrass alomatidan foydalanib, isbotlang: $\sum_{n=1}^{\infty} \frac{1}{(n+x)^4}$, $X = [0;\infty)$ | X da $\{f_n(x)\}$ funksional ketma-ketlikni tekis hamda notekis yaqinlashuvchilikka tekshiring: $f_n(x) = x^n + x^{2n} - 2x^{3n}$, $X = [0;1]$ | X da $\{f_n(x)\}$ funksional ketma-ketlikni tekis yaqinlashuvchilikka tekshiring: $f_n(x) = \frac{1}{x+n}, X = (0;+\infty)$ |
| | Funksional qatorlarning tekis yaqinlashuvchanlik Abel alomati. | Funksional qatorlarning tekis yaqinlashuvchanlik Dirixle alomati. | Quyidagi funksional qatorlarning ko’rsatilgan oraliqlarda tekis yaqinlashuvchiligini, Veyershtrass alomatidan foydalanib, isbotlang: | X da $\{f_n(x)\}$ funksional ketma-ketlikni tekis hamda notekis yaqinlashuvchilikka tekshiring: $f_n(x) = e^{-(x-n)^2}$ $X = (-\infty;+\infty)$. | X da $\{f_n(x)\}$ funksional ketma-ketlikni tekis yaqinlashuvchilikka tekshiring: $f_n(x) = \frac{nx}{1+n+x}, X = [0;1]$ |

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| | | | $\sum_{n=1}^{\infty} \frac{cos3nx}{\sqrt{n^3+x^3}}, X = [0;\infty)$ | | |
| 16 | Funksional qatorlarda hadma-had limitga o'tish. | Funksional qatorni hadma-had integrallash. | $X$ to'plamda quyidagi funksional qatorlar yig'indisining uzluksiz ekanligini ko'rsating: $\sum_{n=1}^{\infty} \frac{arctgnx}{\sqrt[3]{n^5+x}}$, $X=(-\infty;\infty)$. | Quyidagi limitni toping: $\lim_{x\to 1-0} \sum_{n=1}^{\infty}(x^n - x^{n+1})$. | Ushbu $\{f_n(x)\} = \left\{\frac{\cos n\sqrt{x}}{n}\right\}$ funksional ketma-ketlikning $X=[0;+\infty)$ to'plamda tekis yaqinlashuvchi ekanligini ko'rsating. |
| | Tekis yaqinlashuvchi funksional qatorlarning xossalari | Funksional qatorning tekis yaqinlashishi uchun Koshi kriteriysi | $X$ to'plamda quyidagi funksional qatorlar yig'indisining uzluksiz ekanligini ko'rsating: $\sum_{n=1}^{\infty} \frac{\cos^2 nx}{n(n+1)}$, $X=(-\infty;\infty)$ | Quyidagi funksional qatorlarni $X$ to'plamda hadma-had integrallash mumkinmi: $\sum_{n=1}^{\infty}(x^{2n+2} - x^{2n})$, $X=[-1;1]$. | Quyidagi funksional qatorlarni $X$ to'plamda hadma-had integrallash mumkinmi: |
| 17 | Darajali qator deb nimaga aytiladi | Darajali qatorning | Quyidagi darajali qatorning | Quyidagi darajali qatorning | Quyidagi darajali qatorlarning |

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| | | yaqinlashish radiusi deb nimaga aytiladi | yaqinlashish radiusi, yaqinlashish intervali hamda yaqinlashish sohasini toping: $\sum_{n=1}^{\infty}(-1)^{n-1}\frac{(x-3)^{2n}}{n5^n}$. | yaqinlashish radiusi, yaqinlashish intervali hamda yaqinlashish sohasini toping: $\sum_{n=1}^{\infty}\frac{x^{n-1}}{n3^n \ln n}$. | yig'indilarini hadma-had differensiallash yordamida toping: $\frac{x}{1\cdot 2}+\frac{x^2}{2\cdot 3}+\frac{x^3}{3\cdot 4}+\ldots$. |
| | Darajali qatorning yaqinlashish radiusini aniqlashda Dalamber alomatini ayting | Darajali qatorning yaqinlashish intervali bilan yaqinlashish sohasi qanday aniqlanadi | Quyidagi darajali qatorning yaqinlashish radiusi, yaqinlashish intervali hamda yaqinlashish sohasini toping: $\sum_{n=1}^{\infty}(-1)^{n}\frac{x^{2n+1}}{2^{n-1}n\sqrt{n}}$. | Quyidagi darajali qatorning yaqinlashish radiusi, yaqinlashish intervali hamda yaqinlashish sohasini toping: $\sum_{n=1}^{\infty}\frac{[3+(-1)^n]^n}{n}x^n$. | Quyidagi darajali qatorlarning yig'indilarini hadma-had differensiallash yordamida toping: $x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots$. |

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| 18 | Teylor qatori tushunchasi | Funksiyani Teylor qatoriga yoyish va yaqinlashish raiusini topishga oid misollar | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying va bu qatorlarning yaqinlashish radiusini toping: $f(x)=e^x, \quad x_0=3$ | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying va bu qatorlarning yaqinlashish radiusini toping: $f(x)=2^x, \quad x_0=1.$ | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying: $f(x)=\sqrt{x}, \quad x_0=1.$ |
| | Elementar funksiyalarni Teylor qatoriga yoyish | Teskari trigonometrik funksiyalarni Teylor qatoriga yoyish | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying: $f(x)=tgx, \quad x_0=0.$ | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying: $f(x)=\cos x, \ x_0=0.$ | Quyidagi funksiyalarni ko'rsatilgan nuqta atrofida Teylor qatoriga yoying: $f(x)=sinx, x_0=0$ |